

# modern machine shop

FEATURES IN  
BRIEF

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AUTOMOBILE  
ASSEMBLY

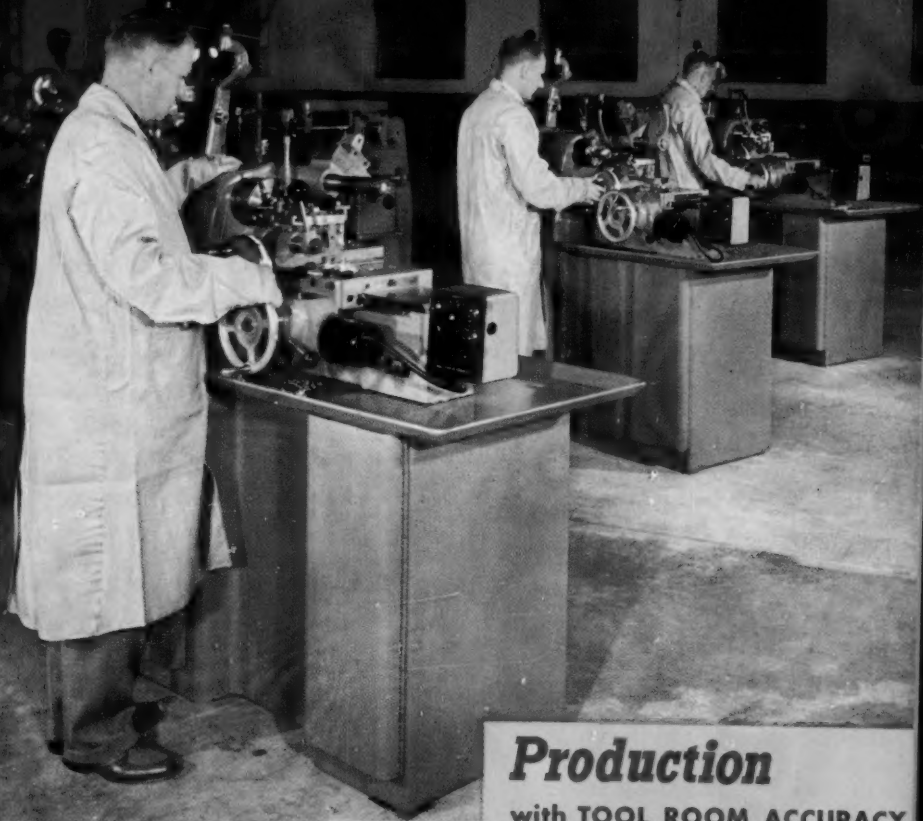
See Page 102

PERISHABLE  
TOOL COSTS

See Page 109

DECEMBER

1957



Photograph Courtesy of  
General Machine & Instrument Co.  
Caldwell Township, N. J.

## ***Production***

with TOOL ROOM ACCURACY  
Increases Demand for the HARDINGE HCT  
Precision Chucking Machine

# ADAMAS

## Top Performance Throwaways



now packaged to give you extra production efficiency

Check these outstanding features:



### Insert Protection

Heavy 30-gauge acetate construction gives 3 times the protective strength of any other method of insert packaging. Individually-formed plastic pockets to fit Adamas' wide range of square, triangular, and round throwaway inserts.

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# modern machine shop

Vol. 30, No. 7, December, 1957

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Member



**LOOKING FORWARD IN AUTOMOBILE ASSEMBLY**

**By J. G. Shepherd**

This discussion provides an interesting case study of the highly mechanized automobile assembly operations performed at the Delaware Assembly Plant of the Chrysler Corporation located at Newark, Delaware.

**Page 102**

**HOW TO REDUCE PERISHABLE TOOL COSTS**

**By Gilbert C. Close**

The author discusses an easy-to-apply program instituted by the El Segundo Division of Douglas Aircraft Company, which has cut perishable tool costs by one-third.

**Page 108**

**MAN-MADE DIAMONDS**

The progress made by the Metallurgical Products Department of the General Electric Company in the development of man-made industrial diamonds is traced in this article.

**Page 116**

**STANDARDIZATION OF PARTS  
SPARKS BEARING PRODUCTION**

**By Bartlett West**

The combination of highly specialized machine tools and specially designed conveying equipment makes possible the highly automated roller bearing production setup at the Bucyrus, Ohio, plant of The Timken Roller Bearing Company.

**Page 119**

# in this issue

DECEMBER 1957 • VOL. 30 • No. 7

## REDSTONE MISSILE

Brief statistics regarding the recently announced Redstone Missile, together with several illustrations showing the missile in production at the Chrysler Corporation plant in Detroit, are presented in this article.

**Page 128**

## CLOSE-TOLERANCE BORING OPERATION

The combination of a powerful-gripping tool chuck and special cutter head enables the Ford Sterling Chassis Parts Division plant to quickly and accurately finish bore rear axle housing assemblies for automobiles.

**Page 132**

## SUPERVISION IN TIME OF STRESS

**By Alfred M. Cooper**

"In time of great stress, we can depend upon industrial foremen to do their jobs with little fuss" is a statement that is clearly emphasized by the author in this very timely, enlightening and highly informative presentation.

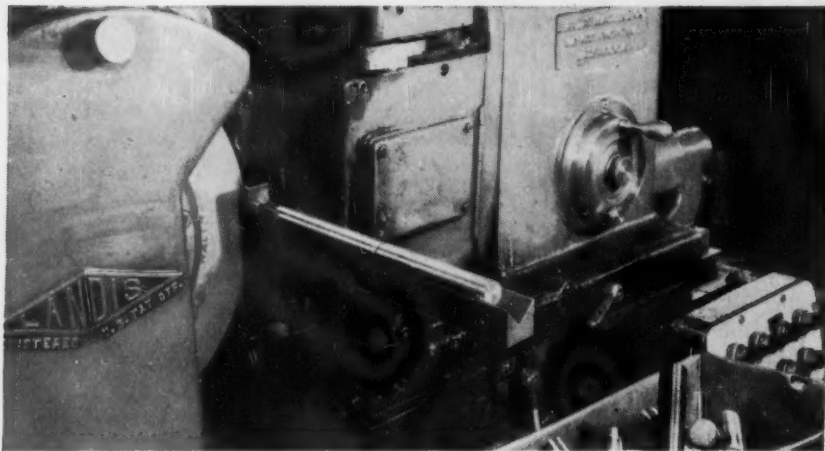
**Page 178**

## SPIRAL POINT PROVIDES NEW TWIST FOR DRILLS

This article discusses a completely new drill point geometry which has been developed by the Cincinnati Lathe and Tool Company, Cincinnati, Ohio, and which can be economically applied to the twist drill.

**Page 154**

modern machine shop



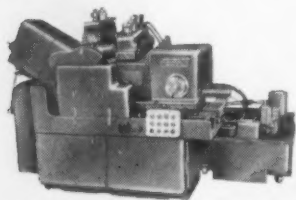
## Threads 7 $\frac{1}{4}$ " per Minute by CONTINUOUS GRINDING

Studs for high-pressure high-temperature service ranging from  $\frac{5}{8}$ " to 1 $\frac{3}{4}$ " in diameter are threaded from blanks of SAE 4140 steel heat-treated to a 260-320 Brinell hardness. In the operations illustrated, 1 $\frac{1}{8}$ " 8 pitch UN threads must be generated 10" long to a Class 7 fit to meet ASA standards (Manual B 1.4). These threads are produced with LANDIS #1 Centerless Thread Grinders by continuous thru-feed grinding at the rate of 7 $\frac{1}{4}$  linear inches per minute, *or better*. The excellent quality and smooth finish of the ground thread has reduced final assembly time and minimized galling.

Centerless Thread Grinders, manufactured exclusively by LANDIS, are designed for the high-speed threading of a wide variety of workpieces from  $\frac{1}{16}$ " to 4 $\frac{3}{4}$ " in diameter. Blanks having one or more diameters, requiring threads on the outer diameter, can be threaded automatically by the thru-feed process as used here at the Kilbourn Engineering Company in Milwaukee, Wisconsin.

\* \* \*

For further information, send specifications and ask for Bulletin E-97.



391

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# Why Grind or Finish-Bore? **PRECISION HONE!**

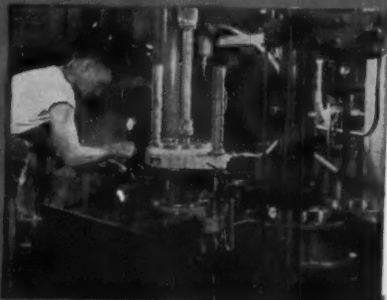
★ CHEAPER      ★ FASTER  
★ MORE ACCURATELY

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Switch from grinding or finish boring to Fulmer Honing! There's a double saving: you cut costs and release boring or grinding machinery for other uses.

Fulmer Honing Machines speed production and lower costs. Ruggedly constructed and engineered to handle greater loads than normal. They assure low upkeep under the most severe operating conditions and provide ample cutting power to the stones.

FULMER machines are designed with a minimum number of parts for minimum maintenance. Five basic sizes provide a machine fitted to any needs. Fulmer precision honing



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usually outperforms conventional grinding or finish boring! Find out how! Write for Bulletin on Honing to: C. Allen Fulmer Co., Dept. S 107 E. 4th St., Cincinnati 2, O.

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December, 1957

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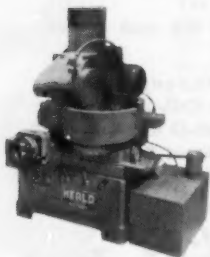






**Large work? Low RMS finish?**

**Here's a shining example.**



***The 30" Heald Model 361 Rotary  
does an outstanding surface grinding job***

Take this case for instance. The column type rotary Model 361-30" is designed to precision surface grind relatively large work. The wheel grinds on its periphery, producing a concentric finish highly desirable in certain applications. The 361 is now available with either a 24" or 30" magnetic chuck, and can easily handle work of the size shown above. This piece has a 2-4 R.M.S. finish and a flatness of .0001 in 30". Send for Bulletin 2-361-1.

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TO HEALD!***



**THE HEALD MACHINE COMPANY**

Subsidiary of The Cincinnati Milling Machine Co.

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**XLO****EX-CELL-O FOR  
PRECISION**

**CHIP-BREAKER ASSEMBLY:** On the opposite end, mounted under the reciprocating chip-breaker wheel is the chip-breaker table with vertical adjustments. It accommodates adjustable tool block fixture which holds tool in place while grinding chip-breaker groove at desired angle.



**TWO MODELS AVAILABLE:** Style 142 for conventional grinding with vitrified or diamond wheels; Style 264, equipped with metal-bonded diamond wheels, for electrolytic grinding.

**new**

## **DUAL PURPOSE RECIPROCATING TOOL GRINDER**

**Ex-Cell-O takes all the work out of both conventional and chip-breaker tool grinding**

Now an entirely new reciprocating double end tool grinder designed by Ex-Cell-O to do two jobs in one—conventional grinding on one end, chip-breaker grinding on the other—has now been added to Ex-Cell-O's line of conventional, double end, carbide and Method X tool grinders. The difference is the adjustable, power-controlled reciprocation of grinding wheels. The operator

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*Machinery  
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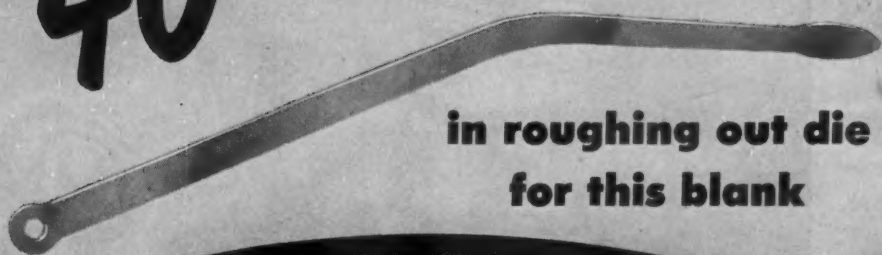
57-96

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# 40%

# SAVINGS

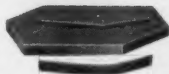


**in roughing out die  
for this blank**

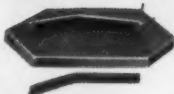
*How it was done . . .*



**1** First the 7 1/2" slug was removed from the 2 1/4" cast iron shoe.



**2** Then the slug was sawed from the die (1" tool steel).

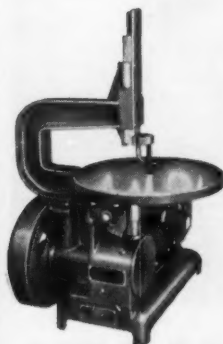


**3** The third operation was the punch holder (1" cold rolled steel.)



**4** The slug was removed from the stripper plate (3/16" cold rolled steel).

## **SAW - FILE - LAP with OLIVER of ADRIAN DIE MAKING MACHINES**

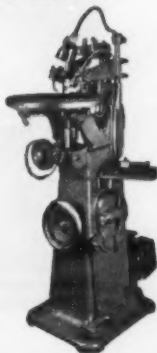


**BENCH MODEL**

... one of the five types in two sizes.

Yes, using the Oliver die making machine saved 40% of the time normally required for roughing out the die for the blank above. The opening has smooth sides, has no rough edges to chip off—and is within .010" of the finished outline. Similar savings can be had on template and cam work.

Oliver die making machines utilize power contour sawing—reduce filing to a minimum. Table tilt produces clearance for die work while filing. Saws, files, lapping sticks and hones can be used interchangeably.



**HEAVY DUTY MODEL**

... for metals up to 3" thick.

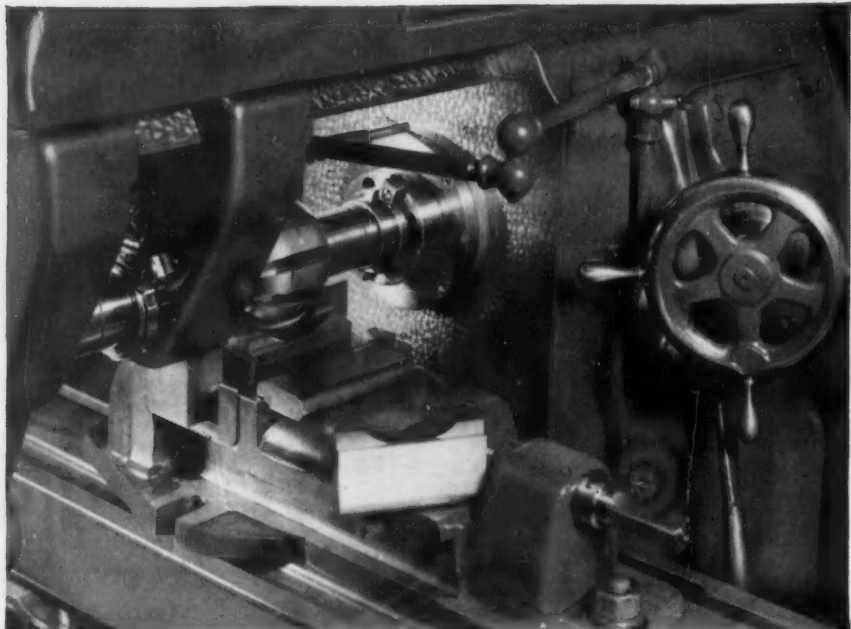
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*Write today for information*

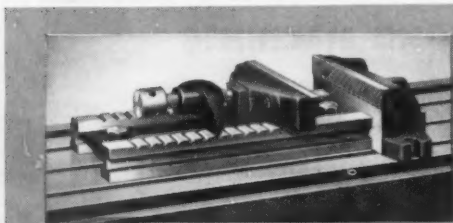
**OLIVER of ADRIAN**

**OLIVER INSTRUMENT COMPANY**

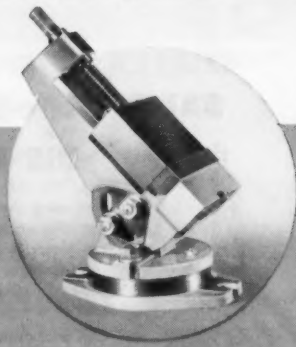
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Taking a heavy cut,  $1\frac{1}{32}$ " deep x  $2\frac{3}{4}$ " wide, in one pass. The parts are held in a CINCINNATI® No. 3 Plain Vise equipped with jaws made especially for the job.



**ALL STEEL VISE.** Slight swivel in movable jaw adapts it to irregularities of rough castings. Notched support bars provide quick adjustment of movable jaw. Publication No. M-1732-1.



**TOOLMAKER'S UNIVERSAL VISE** . . . for general toolroom work. Can be swiveled up to 90° in a vertical plane—360° in a horizontal plane. Publication No. M-1959.



# CINCINNATI

## Cincinnati Vises ... for general machine shop work

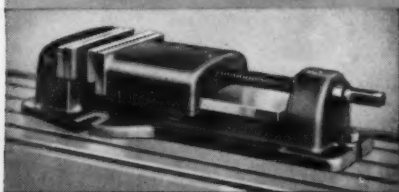
Every shop needs vises of various types. Cincinnati builds four types for general machine shop work such as milling, drilling and shaping. And Cincinnati Vises fulfill the basic requirements for equipment of this type:

1. All Cincinnati Vises . . . Plain, Swivel, Toolmaker's, and All Steel . . . are exceptionally rugged. They hold the part tightly, enabling the operator to take a heavy cut. For proof, look at the illustration (left).

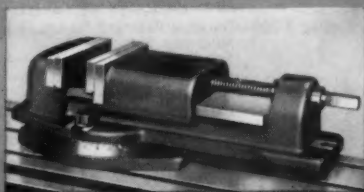
2. It's easy to make special jaws to hold odd-shaped parts, or those requiring accurate location. You can do this yourself, at a fraction of the cost of special fixtures. Complete dimensions will be found in the literature.

Complete data may be obtained by writing for literature listed for each type.

**THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO**  
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**PLAIN VISE.** Available in Nos. 3 and 5 sizes. Depth, width, and opening of jaws: No. 3—1½" x 6½" x 4". No. 5—2½" x 8½" x 7". Publication No. M-1665-1.



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*they're both  
two  
diameter drills....*

**BUT WHICH ONE SHOULD YOU USE?**

**A Mohawk SUBLAND  
..... NATURALLY!!**

Mohawk Sublands are the modern, practical answer to faster, more accurate and economical drilling of multiple diameter cavities.

One Mohawk Subland drill will outwork and outperform two, three, four or more ordinary step type drills... and do the job better.

Why? Because Mohawk Sublands last longer, stay accurate through multiple regrinds and reduce hole costs. They quickly pay for themselves in man hours, equipment and tool dollar savings. And... they're available in an amazing range of "off the shelf" size-optional sizes and types.



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*world's largest producers of Sublands*



MONTPELIER, OHIO

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December, 1957

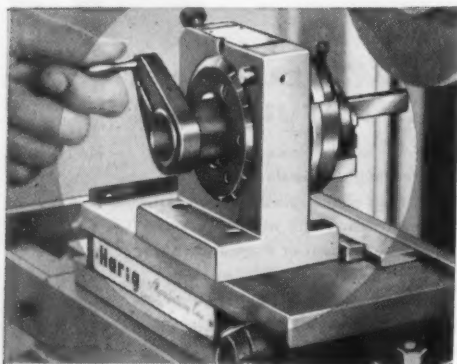
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**HARIG**  
*Precision-Made*  
TOOLS & DIES

PRECISION DIE MAKERS ▶

All types of dies including carbide and  
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HARIG's TML 6x12 SURFACE GRINDER ▶

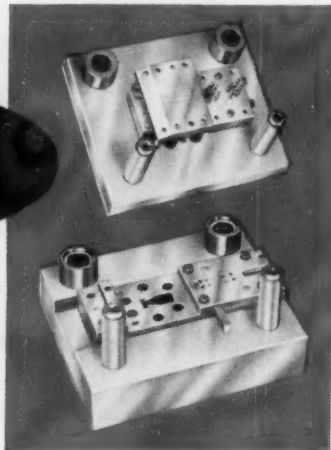
Designed for quick easy operation,  
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maintenance with economy in mind.

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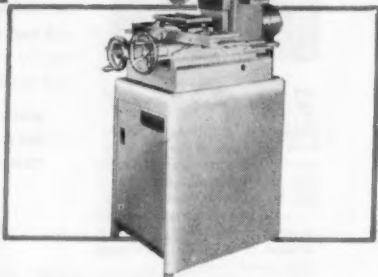
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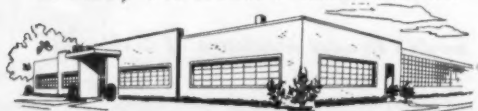


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Fast, accurate perforator grind-  
ing attachment—hand crank for  
easy rotation of index plate,  
single locking screw for making  
quick set-ups.



*Made by The House Precision Built!*



# 5 Basic Reasons why MARVEL HACK SAWS CUT-OFF MORE ACCURATELY...

The consistently accurate performance of MARVEL Heavy Duty Hack Saws is no accident. MARVEL engineers knew, many years ago, that to produce and maintain accurate cutting-off, a hack saw must be designed and built like a fine machine tool.

Some of the basic design principles built into the modern MARVEL Hack Sawing System that makes it the most accurate cutting-off method you can use ARE:

## 1. V-Way Design...Greater Rigidity

Upright and Saddle are precision machined and fitted to form a rigid, integral unit capable of withstanding any cutting load with no deflection or side movement.

## 2. Anti-Friction Bearing Construction

Anti-friction ball or roller bearings are used at all load carrying points. Even the strongly braced saw frame reciprocates on heavy duty, fully enclosed preloaded ball bearings which provide permanent, frictionless rigidity and true-running, straight line cutting strokes.

## 3. Minimum Blade Frame Reach

Close-coupled design and crank lever action of MARVEL Saws keeps the saw frame and blade reach very short in relation to the vertical V-ways on which the unit is mounted. This insures optimum rigidity, even under the most severe operating conditions.

## 4. Positive Relief Blade Lift

On the return stroke, positive relief lift raises the blade to provide proper and "cushioned" lead-in on the next cutting stroke. This prolongs blade sharpness, life and accuracy.



## 5. Rigid Cutting Tool

Cutting-off accuracy requires a rigidly held, relatively short cutting tool. MARVEL Unbreakable High-Speed-Edge Hack Saw Blades, which combine a narrow high speed steel cutting edge permanently welded to a tough alloy steel body, can be tensioned from 200% to 300% more taut than ordinary blades. This provides a most rigid cutting edge.

PS-1305



Write for the MARVEL Catalog and the complete story on  
MARVEL METAL CUTTING SAWS



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Now grinding wheels run clean,  
give finer, more accurate finish at  
"big-three" truck plant



**CODOL**  
LIQUID  
GRINDING  
COMPOUND



**CODOL  
LUBRICATES  
AS IT COOLS!**

Stock removal in this operation on a Landis grinder is .035 in., with tolerance of .0006 in. Stuart's Codol Liquid Grinding Compound lubricates at the point of contact between wheel and work to eliminate wheel-loading, reduce friction, assure proper chip formation, prevent heat stresses.



Now that about 30 grinding machines in the crankshaft and other departments of this truck manufacturing plant are using Stuart's Codol Liquid Grinding Compound, all hands agree that results are much better, problems greatly reduced. Wheel-loading and burning, which were problems with a coolant previously used, are now eliminated and a distinct improvement in finish is noticeable. Codol efficiently cleans both wheel and work, drops all chips in the tank, and returns clean. Rusting, also once a problem, is now absent. Effective cleansing and superior lubricity keep temperatures down, eliminate burning, and improve accuracy.

On-the-job economies with Codol add up to a substantial saving on costs experienced before. The previous compound had to be mixed one part coolant to 30 parts water. Excellent results are now achieved mixing one part Codol in 60 or 70 parts water. Clean-running wheels last longer, produce more parts. The previous coolant often went sour in a few days—Codol stays fresh for the full period between scheduled chip clean-outs.

#### HERE'S WHAT THEY SAY ABOUT CODOL:

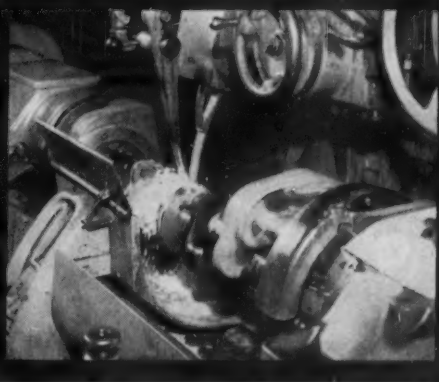
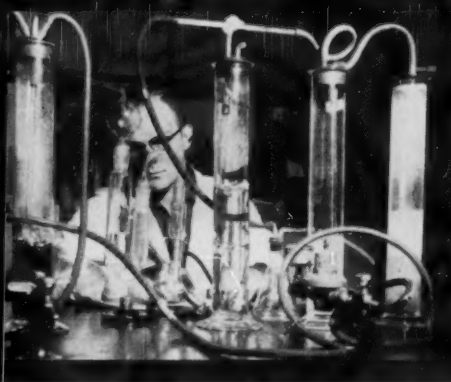
*"The wheel doesn't load up as it did before... finish is much improved... work runs cool, and this gives us improved accuracy... more cuts per wheel."—machine operator*

*"Wheel-loading and burning used to be serious problems. Now, we get better corners and have no burning of the side wall. Codol permits good settling of chips."*

*"Now we have no rusting whatever. Another point—we leave our Codol standing over the week end and have no worries about its deteriorating."—grinder operator*

The plant's engineering laboratories tested numerous coolant materials and reported Codol to be unsurpassed as a remedy for the wheel-loading problem.

Codol eliminates tearing and scratching of the finish and has earned full credit for a marked increase in wheel life on thirty grinders throughout the plant.



Phone your  
Stuart Service Center

Arrange now to test Stuart's Codol Liquid Grinding Compound on your difficult grinding operations.

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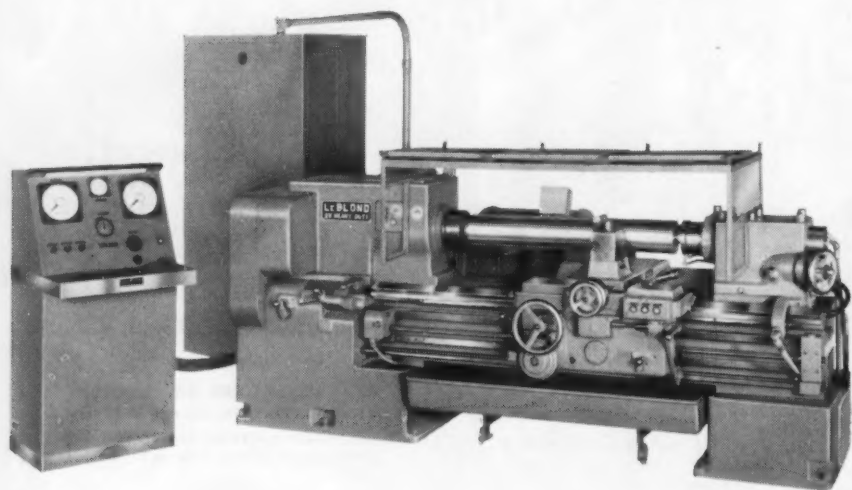
**METALWORKING  
LUBRICANTS**

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December, 1957

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## **This 150 H. P. LeBlond lathe**



Special LeBlond 20" uses 150 hp motor, provides infinite speeds from 250 to 5000 rpm, 90 feeds from .002 to .136. Special bearings in head and tailstock are cooled and lubricated by pressurized oil circulating system; common oil reservoir is temperature controlled by a thermostatic

heat exchanger. Remote-control station includes: motor-generator start and stop, spindle start and stop, length and cross feed engage and disengage, horsepower meter, spindle speed indicator, cutting speed indicator, spindle speed control, overload lights and timer.



To test new cutting media and tools to their limits, General Electric's Metallurgical Products Department (manufacturers of Carboloy cemented carbides) required a faster, more powerful lathe than any available. This high speed LeBlond 20" lathe was developed for this purpose. It will rev up to 5,000 r.p.m., make efficient use of its 150 h.p. and permit a 50% overload for short periods.

LeBlond lathes are noted for their inherent stamina and rigidity. In this case it was only necessary to make modifications in the headstock, tailstock spindle and controls—the rest of LeBlond's Heavy Duty 20" was already powerful enough to take the new high loads.

Just what will this lathe do? The following test data tell the story:

## tests tools for tomorrow

### TEST DATA

WORKPIECE—SAE 1045, 180 Brinell, 48" long.  
TOOL—CEMENTED OXIDE 0 - 30.

#### Test 1

Workpiece diameter, 7.65". 5000 rpm 10,000 sfm  
.010 feed. Carriage travel, 50" per minute over entire  
workpiece .110 depth of cut. 138 hp consumed

#### Test 2

Workpiece diameter, 6.65". 4300 rpm 7500 sfm  
.010 feed. Carriage travel, 43" per minute over entire  
workpiece .110 depth of cut. 105 hp consumed

#### Test 3

Workpiece diameter, 6". 5000 rpm 7800 sfm  
.015 feed. Carriage travel, 75" per minute  
.100 depth of cut. 148 hp consumed

Perhaps you've been looking for a lathe with this kind of power and speed. Maybe you have another special turning problem with which LeBlond could help. Or you simply need a good dependable engine lathe. In any case, you can call on LeBlond with confidence. See your nearby LeBlond Distributor or write—

\* 113.6 miles  
per hour!

... cut with confidence

THE R. K. LEBLOND MACHINE TOOL COMPANY

Cincinnati 8, Ohio



World's Largest Builders of a Complete Line of Lathes for More Than 70 Years

For more data circle 320 on Postpaid Card

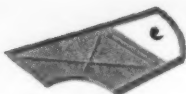
December, 1957

modern machine shop 19

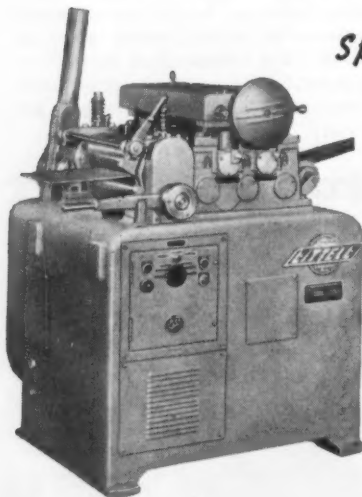
FROM COIL



TO STAMPING



# THE **LITTELL** LINE

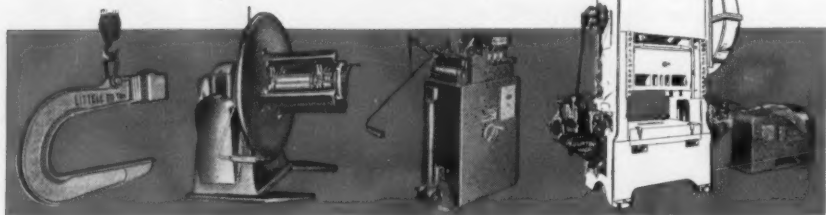


## *Speeds Production, Cuts Costs*

Littell Hooks, Reels, Straighteners and Roll Feeds are the original key tools for flexible, productive, profitable automatic punch press operation. Here are typical units from the Littell line.

### **No. 418-HRP HYDRAULIC DRIVE FEED-ING AND STRAIGHTENING MACHINE**

Automatically straightens coil stock and feeds to any type punch press or square shear. Handles stock up to .125" thick. Feeds up to 19" lengths at 40 strokes per minute, or up to 38" lengths at 20 s.p.m. Easily moved from press to press by fork truck or crane. Operated independently. Fully described in Bulletin B-10.



#### **HOOKS...**

coil lifting capacities, 1,000 to 40,000 lbs.

#### **REELS...**

Spindle Reels for 300 to 40,000 lb. coils. Cradle reels for coils up to 30,000 lbs.

#### **STRAIGHTENERS**

...straighten coil stock 1" to 90" wide, .010" to .125" thick.

#### **AUTOMATIC ROLL FEEDS**

... Used with compound, single and progressive dies on all type presses. Handle all sizes of stock.



REELS • STRAIGHTENING AND FEEDING MACHINES • SHEETING LINES • ROLL FEEDS • COIL CRADLES  
DISTRICT OFFICES: DETROIT, CLEVELAND

4163 Ravenswood Ave. • Chicago 13, Illinois

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**LITTELL CATALOG No. 56** tells the complete story. Write for free copy.



# What *Bridgeport* is doing to satisfy an increasing demand

**F**or those who are waiting for shipment of Bridgeport Turret Milling Machines, may we point to the following:

. . . in 1951 we moved into a new, modern plant laid out for the economical production of our machine.

. . . by 1954 production of Bridgeport Millers was increased 100% over 1951.

Expansion has been continuous since that time and we have now completed another program which will give us more than four times our 1951 production.

This program of increasing plant capacity has been accompanied by effort to maintain and improve performance and accuracy wherever possible and by the use of the best machine tools on the market, augmented by special machine tools of our own design . . . and we have managed to accomplish these results without any price increase.

Our continuing aim is to meet customers' demands for the highest in quality, performance and versatility at a fair price.



## BRIDGEPORT ATTACHMENTS and ACCESSORIES

Milling Attachments  
Cherrying Attachments  
Right Angle Attachments  
Milling Machine Vises  
Boring Heads  
Hydraulic Duplicator  
Slotting Attachment  
Measuring Attachment  
Coolant Pump  
Power Feed to Table

Raising Blocks  
Cross Travel Stop  
Lights  
Profilers  
Collets  
Shell Mill Holders  
Fly Cutters  
Threaded Arbors  
Stub Arbors  
End Mill Holders

*Details on Bridgeport Millers are available from your nearest dealer or from us direct.*

# *Bridgeport* MACHINES, INC.

*Bridgeport, Connecticut*

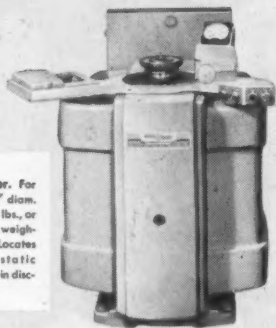
*Manufacturers of High Speed Milling Attachments and Turret Milling Machines*

For more data circle 322 on Postpaid Card

December, 1957

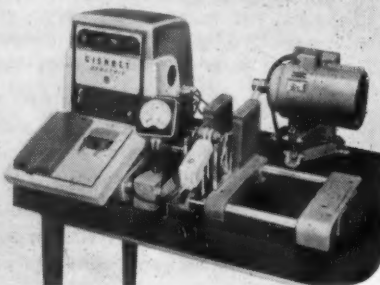
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# GISHOLT takes the ...cuts time

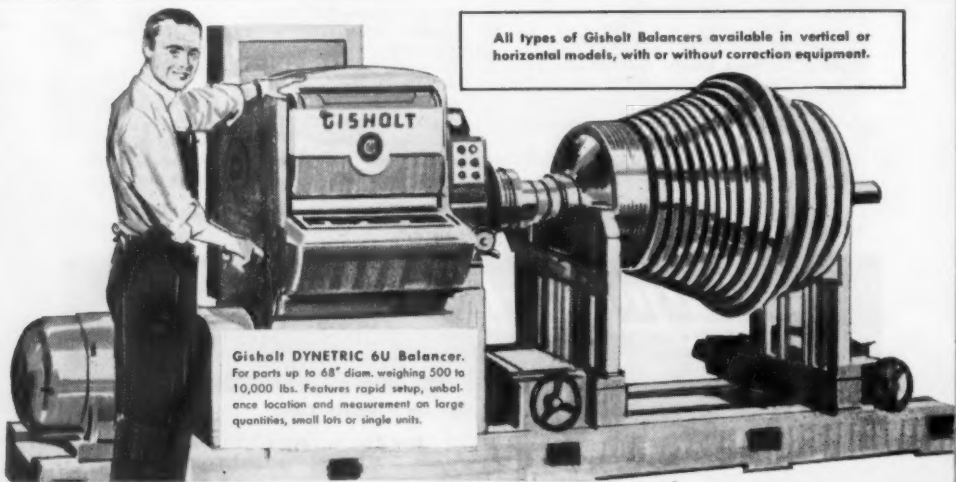


**Gisholt 15V1 Balancer.** For parts up to 11 1/2" diam. weighing 1 to 15 lbs., or up to 17 1/2" diam. weighing 2 to 50 lbs. Locates and measures static (force) unbalance in disc-like parts.

**Gisholt OSB Bench Balancer.** For parts up to 6" diam. weighing 0.25 to 5 lbs. Small parts readily handled, with location and amount of unbalance in each of two selected planes accurately determined in 15 seconds or less.



All types of Gisholt Balancers available in vertical or horizontal models, with or without correction equipment.

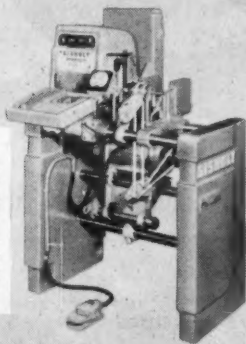


**Gisholt DYNETRIC 6U Balancer.** For parts up to 68" diam. weighing 500 to 10,000 lbs. Features rapid setup, unbalance location and measurement on large quantities, small lots or single units.

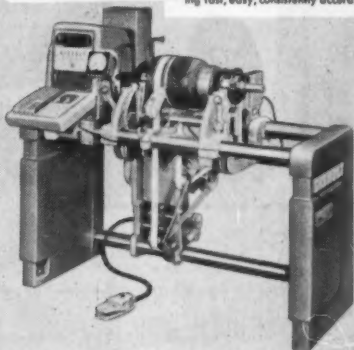
# guesswork out of balancing and costs, too!



**Gisholt 15 Balancer.** For parts up to 12" diam. weighing 1 to 30 lbs. Locates and measures either force or moment unbalance effects, indicating amount of correction in units most practical for part.



**Gisholt 35 Balancer.** For parts up to 24" diam. weighing 15 to 300 lbs. Gisholt Balancers eliminate charts and graphs, make balancing fast, easy, consistently accurate.



**IN A MATTER OF SECONDS**, a Gisholt Balancer locates and measures vibratory movements in either one or two planes (force or moment), and tells your operator precisely where and how much correction to make to balance the part.

By simply reading the Amount Meter, he knows instantly how much solder or how many washers to add, or how deep to drill, etc. There is no computation, no charts or graphs because Gisholt Balancers tell the story directly—and they tell it in terms of the actual correction method employed.

How is it done? Through electrical networks, provid-

ing the necessary amplification for precise readings... and eliminating guesswork by separating and isolating unbalance effects, for maximum accuracy and ease of correction on all types of work.

What will Gisholt Balancing mean in your own operations? Just this: you'll balance more parts per hour—to highest possible standards at lowest possible costs.

Whether you plan to balance parts weighing only a few ounces to 150 tons...your Gisholt Representative can show you the better way of doing it with Gisholt Balancers. Call him today!

## GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin, U. S. A.

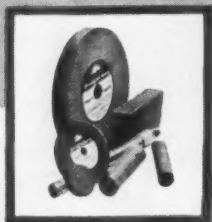
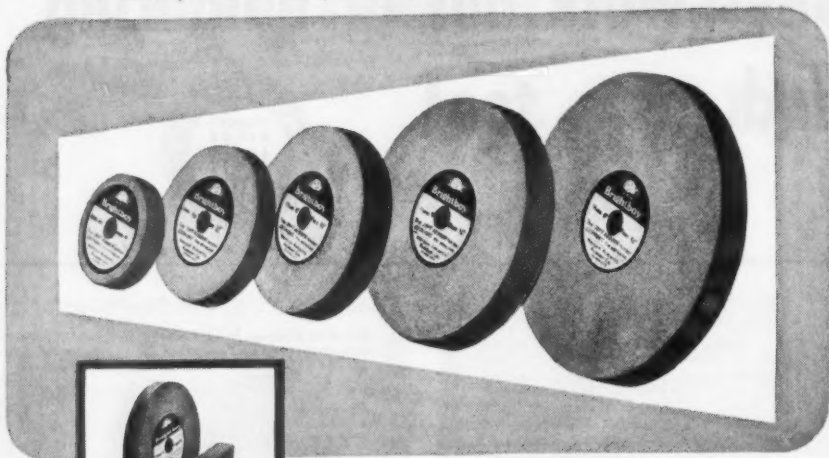


**WRITE TODAY** for 36-page illustrated booklet "Balancing Machines," analyzing problems of balancing rotating parts.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

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## BURR, CLEAN, FINISH, POLISH



*in a one-step operation  
never before associated with abrasives!*

### Discover:

Brightboy's new revelation in time-saving finishing! Brightboy's definitely different working action. Brightboy's combination of ABRASIVE and RUBBER, working simultaneously.

Versatile, multi-use Brightboy promotes refreshing, new methods, new work short cuts, new finishes. Not only on metals, but also on plastics, laminated materials, wood, glass.

Brightboy is made in a wide range of wheels and accessory products — rods, sticks and blocks — for machine and manual operations. In STOCK NUMBERS, JOB-MATCHED TO YOUR REQUIREMENTS. In a comprehensive selection of Silicon Carbide and Aluminum Oxide abrasive grains. Each in grades from extra fine to extra coarse. Each in soft, firm and tough rubber binders.

Ask your dealer to recommend the Brightboy number ideally suited to your usual — and unusual — work, and for the Brightboy catalog listing grains, textures, machine speeds, work suggestions. Write us if he cannot supply you, or on any problem in which finishing is involved.

READY NOW! "Notes From The Brightboy Service Engineer". An informal news letter describing various Brightboy applications reported by Brightboy Service Engineers. WRITE FOR YOUR COPY or ask your dealer.



**BRIGHTBOY INDUSTRIAL DIVISION  
WELDON ROBERTS RUBBER CO.**

95 North 13th Street • Newark 7, N. J.

*America's Pioneer Manufacturer  
of Rubber-Bonded Abrasives*

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Now **SIMONDS** Offers You  
a Fine Grained, Silicon Killed

## **LOW CARBON Flat Ground Steel**



This new line is in *ADDITION* to  
**SIMONDS FLAT GROUND  
DIE STEEL**

*High Grade Alloy Tool Steel  
(Oil Hardening — Air Hardening)*



Here's a fine-grained, forging quality, silicon-killed steel that opens up the way to important savings on items like jigs, fixtures, patterns, stripper plates, punch pads, die plates, die-blocking shims . . . and parts that don't require heat treatment or in some instances, just case-hardening.

This new line of low-cost, LOW-CARBON Flat Ground Steel rounds out the present Simonds line of Oil Hardening and Air Hardening Die Steel. What's more, it has equally fine finish . . . and is made to the same close tolerances, with excellent welding quality and machineability.

Simonds LOW-CARBON Flat Ground Steel is furnished in a wide range of flats from  $\frac{1}{16}$ " to  $1\frac{1}{2}$ " thick and  $\frac{1}{2}$ " to 16" wide, and in squares from  $\frac{3}{8}$ " to  $2\frac{7}{8}$ ". All sizes come in standard, ready-to-use 24" lengths, individually packaged. Stock sizes are ready now . . . special sizes on order. Get full details from your Simonds Distributor today.



### **TYPICAL CHEMICAL ANALYSIS**

C. .18	Mn. .50
Si. .20	Phos. & Sul. .04

Heat Treatment By  
Case Hardening Only

Factory Branches in Boston, Chicago, Shreveport, La., San Francisco and Portland, Oregon  
Canadian Factory in Montreal, Que. Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.  
Miller Tool Co., Newcomerstown, Ohio, Simonds Abrasive Co., Philadelphia, Pa., and Arvida, Que., Canada

**For Fast Service  
from  
Complete Stocks**



Call your

**SIMONDS  
DISTRIBUTOR**

# COMPARE THESE REDUCED PRICES!

**TREMENDOUS SAVINGS ON**

# DIAMOND TOOLS



*famous diamond tool manufacturer offers  
sensational savings . . .*

These are all whole natural stones of good commercial quality and meet all shop requirements. Take advantage of these savings. All tools supplied in  $\frac{7}{16}$ " x 3" holders (standard size) unless otherwise specified. Other holder sizes can be supplied for an additional 75c each.

## ORDER FROM THIS AD!

KARAT	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Only	\$2 <sup>85</sup>	\$5 <sup>00</sup>	\$7 <sup>50</sup>	\$10 <sup>25</sup>	\$15 <sup>00</sup>	\$20 <sup>00</sup>	\$26 <sup>00</sup>	\$32 <sup>00</sup>

PHONE OR WRITE FOR DISCOUNTS ON QUANTITY PURCHASES

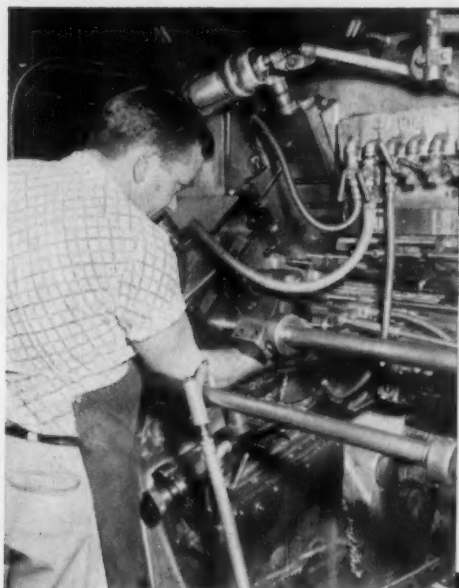
***Abrasive* DRESSING TOOL CO.**

14522 SECOND BLVD. DETROIT, MICHIGAN

Phone: TOWnsend 8-6000

THIRD GENERATION OF DIAMOND EXPERIENCE

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## WARNER & SWASEY MULTI-SPINDLE AUTOMATICS

- 5-SPINDLE BAR MACHINE  
1 1/2" Standard Capacity  
2 1/4" Oversize Capacity
- 5-SPINDLE CHUCKING MACHINE  
6" Swing
- 6-SPINDLE BAR MACHINE  
1 1/4" Capacity



## WARNER & SWASEY AUTOMATIC CUTS SMALL LOT COSTS...

*solves inventory problem for Cleco Division, Reed Roller Bit Company*

Cleco Division, Houston, Texas, manufactures a wide variety of air tools. About 6000 different component parts must be machined each year—and, in order to keep reasonable inventory, in relatively small lots ranging from 100 to 1000 pieces.

While production on small hand-operated turret lathes kept inventory in line, it resulted in too high a cost per piece. On the other hand, economical production on conventional automatics required larger lot sizes and higher inventories.

In 1948, Cleco installed a Warner & Swasey 5-Spindle Automatic to solve both these problems. Its quick setup per-

mits machining small lots at automatic rates—reducing cost per piece and inventory at the same time.

This automatic has been operated on a two-shift basis—the equivalent of 16 years of one-shift production—with an exceptionally low record of downtime. Only \$144 has been spent for repair parts. And despite this usage cross slide form cuts to within .002" are easily held.

Cleco operators like the automatic's quick-set quadrants which eliminate cam changing for feed strokes, its micrometer-dial cross slide adjustment, and general ease of operation.

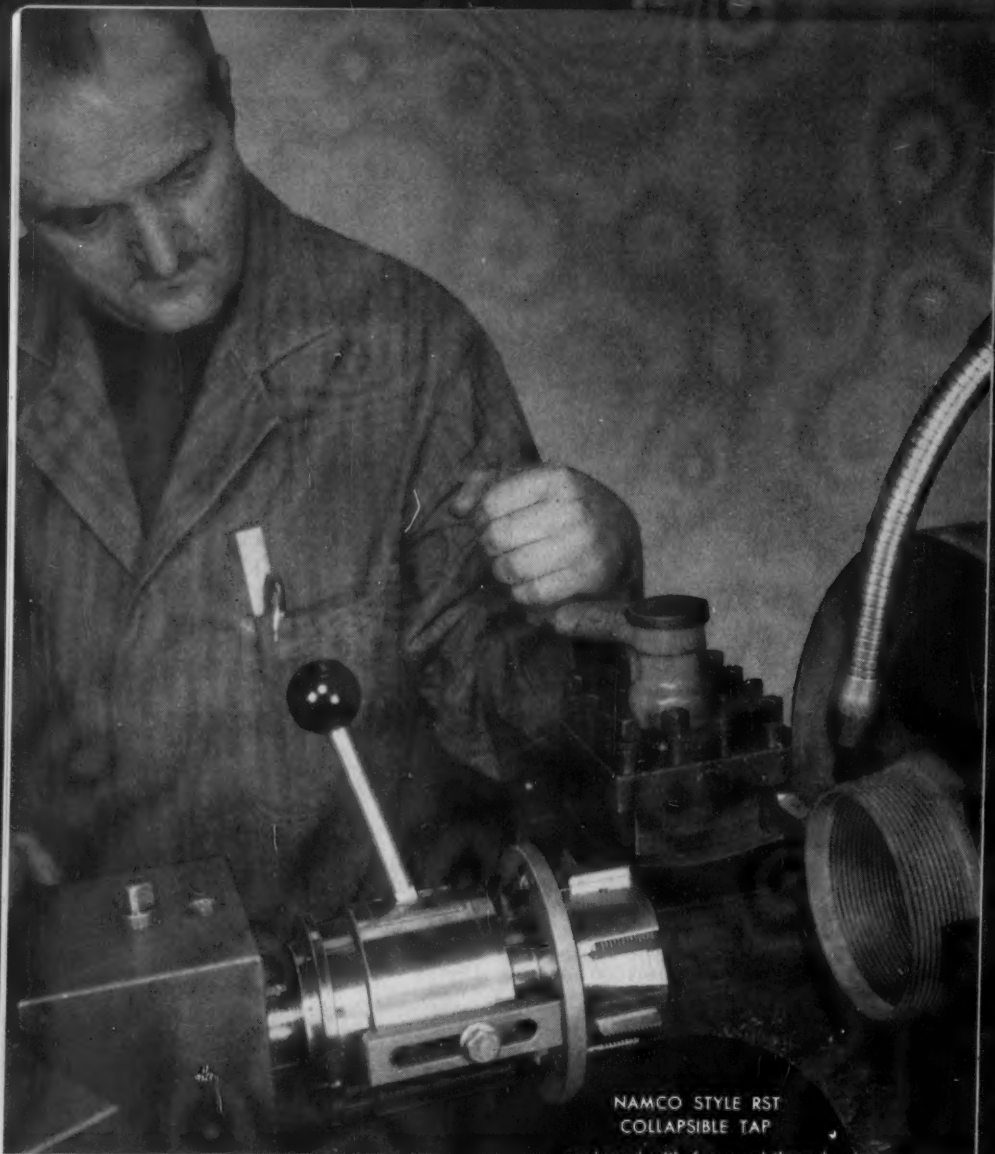
**YOU CAN PRODUCE IT BETTER, FASTER,  
FOR LESS...WITH A WARNER & SWASEY**



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December, 1957

modern machine shop 27



**NAMCO STYLE RST  
COLLAPSIBLE TAP**

equipped with 6 ground-thread  
radial-blade chasers,  
on stationary-spindle machine.  
(RST Head also available  
with circular chasers,  
which are regrindable through  
a full 270°)

# Namco COLLAPSIBLE TAPS

(FOR ROTATING OR STATIONARY-SPINDLE MACHINES)

for smooth, clean thread form . . .  
fine fit . . . uninterrupted tapping . . . on  
long or short runs

**POSITIVE PRECISION**—Compact construction and unique core piece design assures rigid, full-length chaser support; heavy body supplies ample side support.

**NO TIME LOST**—Positive, trigger-like collapsing action *at instant cut is finished* eliminates drag . . . provides fast, unmarred threading on all types of horizontal or vertical machines, at maximum machining speeds.

**ACCURACY EASILY MAINTAINED**—Minimum number of parts, hardened and

precision-ground throughout, assures less wear—greater accuracy. Less down time because replacements are fewer and easier.

**QUICK ACCURATE ADJUSTMENT** for all diameters within range of head. One screw adjusts all chasers, *simultaneously*, to precise diametric requirement.

**VERSATILE**—Same RST Head can be used on either stationary or revolving-spindle machines.

## A WIDE RANGE OF SIZES AND TYPES



Style RSA.

Solid, adjustable.  
Range 1 1/4" to 4".



Style RST.

With radial blade chasers.  
Range 1 1/4" to 4".



Style RST.

With circular chasers.  
Range 3" to 5".



Style RES-L. Range:  
With radial chasers,  
2 3/4" to 4"; with  
circular chasers,  
4 1/2" to 13 3/8".

For detailed information, ask for Bulletin DT-52

# National Acme

THE NATIONAL ACME COMPANY, 183 EAST 131ST STREET, CLEVELAND 8, OHIO

SALES OFFICES: • Newark 2, N. J. • Chicago 6, Ill. • Detroit 27, Mich.

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# GET ARMCO STAINLESS BARS

when, where and how you need them

... from independent steel distributors

When you need Armco Stainless Steel bar stock and need it *now*, a call to your independent steel supplier can pay off. Same-day service is ordinary; delivery in hours is often possible.

Where do you need your stainless bar and wire? It's a fact that your independent supplier may be able to put steel where you need it faster than you could get it from your own inventory.

How much time must you spend and what will be the scrap loss before stainless bar or wire

from your inventory is ready to use? That's how much you'll save by buying steel *tailored* to your needs by your steel supplier.

## Wide Selection

More than 30 standard and special grades of Armco Stainless Steel bars and wire—in a wide range of shapes, sizes and conditions—are available through independent distributors. There's one near you. Just write us for his name.

## Armco Steel Corporation

2286 CURTIS STREET, MIDDLETOWN, OHIO

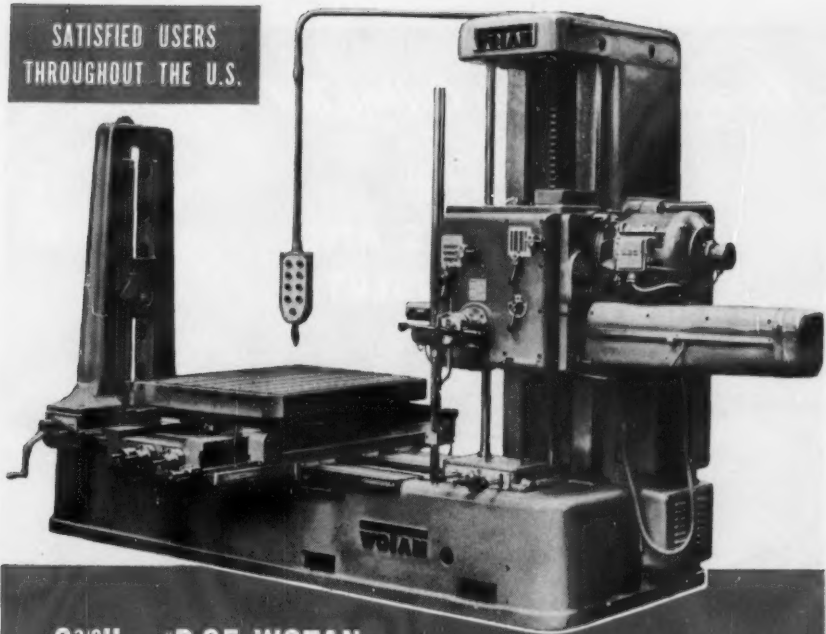
Sheffield Steel Division • Armco Drainage & Metal Products, Inc. • The Armco International Corporation



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**SATISFIED USERS  
THROUGHOUT THE U.S.**



**33/8" - #B 85 WOTAN  
HIGH PRECISION  
BORING MILL  
for Toolroom and Production**

**CAPACITY:**

Vertical Capacity 36", Distance  
Spindle to Outboard Support 86",  
M.T. #5, Speeds up to 1000 RPM.

**WOTAN BORING MILLS**

are also built in sizes 43/8" and 53/8"  
Table and Floor Type Models.

**DEALER INQUIRIES INVITED**

**Power Operated Rotary Table  
Nitrided Roller Bearing Spindle  
Electro-magnetic Clutches  
Rapid Power Traverse throughout  
Threading Attachment  
Centralized Lubrication & Controls**

**OPTIONAL FEATURES**

**Optical Accuracy Reading  
Attachment of Spindle Head,  
Outboard Support and Cross-table  
Quick Change Spindle Taper**

**INDEX INDUSTRIAL CORPORATION**

**150 BROADWAY • NEW YORK 38, N. Y. • BEekman 3-4540**

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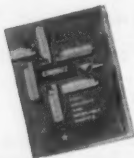
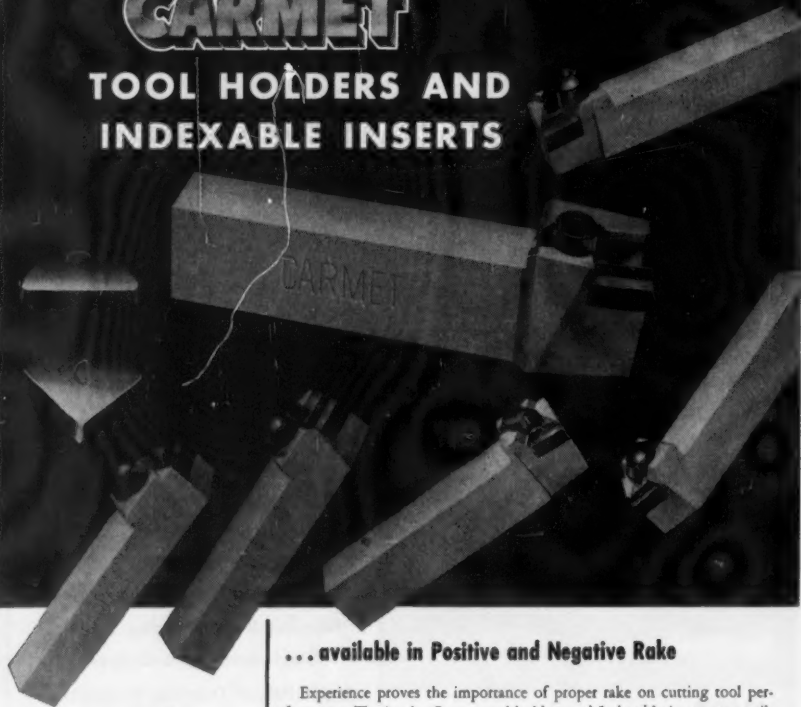
December, 1957

modern machine shop 31

*Designed for your Cutting Tool Program...*

**CARMET**

**TOOL HOLDERS AND  
INDEXABLE INSERTS**



Write for this **NEW CATALOG:**  
**CARMET TOOL HOLDERS  
AND INDEXABLE INSERTS**

Expanded to 16 pages, this latest edition contains specifications of Carmet tool holders and Indexable inserts, replacement parts for tool holders, and information on choosing the proper carbide grade for the job.

**ADDRESS DEPT. M5-96**

NEW 5850

**... available in Positive and Negative Rake**

Experience proves the importance of proper rake on cutting tool performance. That's why Carmet tool holders and Indexable inserts are available in *both* positive rake (for light cutting on easy-to-machine materials) and negative rake (for heavy cutting on high tensile materials).

**CHECK THESE FEATURES**

- Up to eight cutting edges on each carbide insert.
- Grinding is eliminated—no special reconditioning equipment needed.
- Each insert is permanently marked for easy grade identification.
- Tool holders cadmium plated to resist corrosion and chip erosion.
- Tool holder design permits quick, accurate indexing of inserts to new cutting edge.
- Inserts cost but a few pennies per each new cutting edge.

Ask your A-L representative or distributor for engineering assistance in choosing the right tool for your requirements from Carmet's complete line. *Allegheny Ludlum Steel Corporation, Carmet Division, Detroit 20, Michigan.*

For all your **CARBIDE** needs, call  
**ALLEGHENY LUDLUM**

Branch offices and distributors in all principal cities



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↓ Use this Reader Service Card for requesting more information on products described and advertised ↓

# READER SERVICE CARD

DECEMBER, 1957

Your Name \_\_\_\_\_

Your Title \_\_\_\_\_

Company Name \_\_\_\_\_

modern  
machine

Company Address \_\_\_\_\_

shop

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Products Manufactured \_\_\_\_\_

Number of Plant Employees \_\_\_\_\_

431 Main Street  
Cincinnati 2, Ohio

Circle KEY numbers (NOT PAGE NUMBERS) for more information on items described or advertised in this issue.

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27	57	87	117	147	177	207	237	267	297	327	353	379	405	431	457	483	491	491	491	491	491	491	491
28	58	88	118	148	178	208	238	268	298	328	354	380	406	432	458	484	492	492	492	492	492	492	492
29	59	89	119	149	179	209	239	269	299	329	355	381	407	433	459	485	493	493	493	493	493	493	493
30	60	90	120	150	180	210	240	270	300	330	356	382	408	434	460	486	494	494	494	494	494	494	494

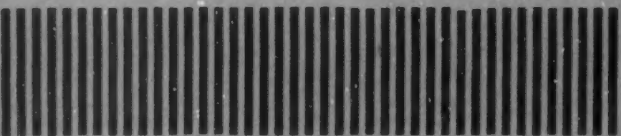
**FIRST CLASS**  
PERMIT No. 1702  
CINCINNATI, OHIO

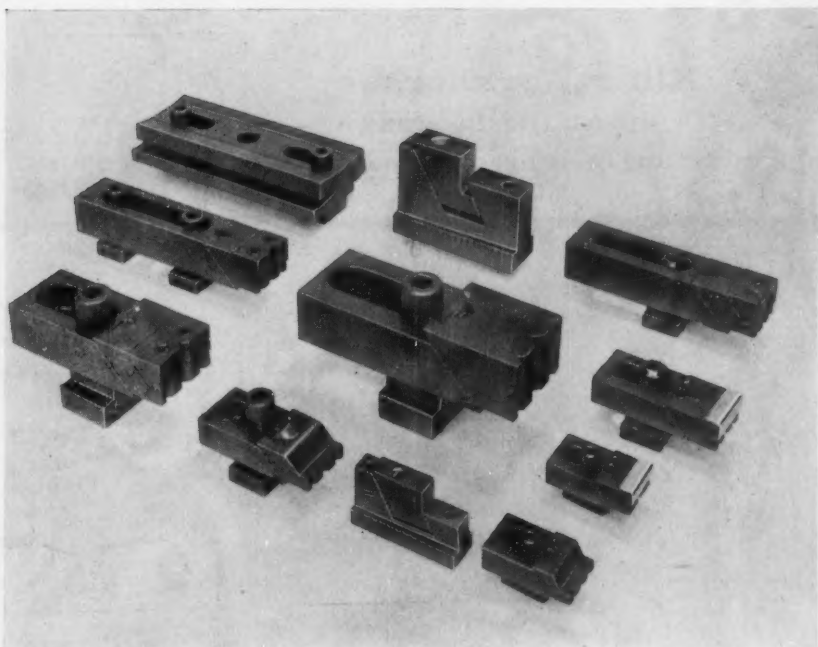
**BUSINESS REPLY CARD**  
*No Postage Stamp Necessary if Mailed in the United States*

**5 C POSTAGE WILL BE PAID BY—**

**modern  
machine  
shop**

**431 MAIN ST.  
CINCINNATI 2, OHIO**

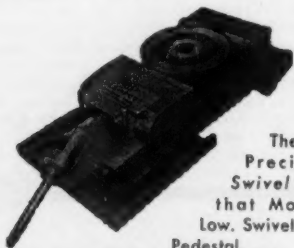




Where you can get . . .

## DOWN-HOLDING DEVICES for any machine table or face plate

J & S All-Purpose Jaw Clamps eliminate U-Clamps, Straps and Fingers for lathes, planers, milling machines, boring millers, jig borers, etc.



The only  
Precision  
Swivel Vise  
that Mounts  
Low. Swivels. No  
Pedestal.

Faster Set-up with any of the 5 Models of J & S Jaw Clamps—one adjusting screw has a holding force of 2½ tons on the Small Model, to 12 tons on Jumbo Model for positioning and holding the work-piece.

Single powerful clamping action obtained from the 45° angle inward and downward movement of the jaw clamp is easily applied and controlled. Compact, efficient design of J & S Jaw Clamps eliminates the usual obstruction problems—no interference with measuring tool readings.

See your industrial distributor or write today for free literature.

WHEEL DRILLERS

**J&S**  
TOOL CO. INC.

JAW CLAMPS • PRECISION VISES • DOWN-HOLDING DEVICES

**J & S TOOL CO., INC.**

**CLAMPCUT** ONE END

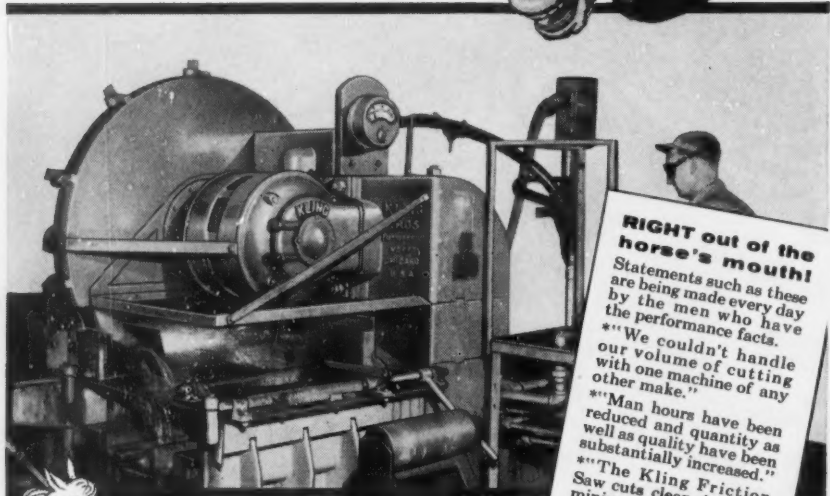
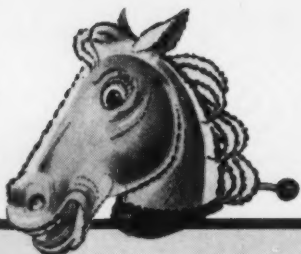
871 DORSA AVE.  
LIVINGSTON, NEW JERSEY

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December, 1957

modern machine shop 33

**Kling Workhorses**  
speak the language  
production men love to hear!



**\*Increased production 10 TIMES  
with a Kling friction saw.\***

**RIGHT out of the  
horse's mouth!**  
Statements such as these  
are being made every day  
by the men who have  
the performance facts.  
\*“We couldn't handle  
our volume of cutting  
with one machine of any  
other make.”  
\*“Man hours have been  
reduced and quantity as  
well as quality have been  
substantially increased.”  
\*“The Kling Friction  
Saw cuts clean, leaves a  
minimum of burr.”  
\*Names available on re-  
quest.

“Production sawing of structural steel I-beams, angles, channels, etc. has been increased ten times with a Kling Friction Saw” . . . This statement was relayed to us by a man who had the performance facts—straight from the Workhorse's mouth.

And men who have the facts are relaying statements like these to men who want to know the facts. Straight from the Work-

horse's production records . . . All you have to do is ask them!

We will gladly supply you with a complete list of Kling Friction Saw users in your area. Write today . . . ask for a list of users of Kling Friction Saw Workhorses . . . and for the complete technical bulletin #4200. Kling Brothers Engineering Works, 1320 N. Kostner Ave., Chicago 51, Illinois.



**Kling** **Workhorse Machines**

Friction Saws; Shears, Rotary, Double Angle and Guillotine; Punches; Mill-All; Combination Shear, Punch, Coper; Rolls, Angle and Plate Bending; Bulldozers.  
Export Distributor: Simmons Machine Tool Corp., 50 E. 42nd Street, New York 17, N. Y.  
Exclusive Canadian Distributor: Brown-Beggs Foundry & Machine Co. Ltd., Hamilton, Ont.

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256-MP



**NOW . . .**

**CUT DOWNTIME with**

**WHITMAN & BARNES**

**Perma-  
brazed** \*


**CARBIDE  
TOOLS**

\*PIONEERED AND DEVELOPED  
BY WHITMAN & BARNES

Perma-Brazed is an advanced process that enables carbide tips to be brazed with a specially developed high temperature alloy at the same time the high speed steel bodies are hardened. The results? . . . uniform body hardness and carbide tips that will not come loose due to braze melting. You can even drill cast iron dry without fear of tip failure. And the payoff? . . . less machine down-time, lower cost per hole, longer tool life. Ask your W&B distributor for Perma-Brazed carbide tools today!

*"Masters of Fine Tools Since 1848"*



**CALL YOUR  DISTRIBUTOR FOR . . .**

**RELIABLE  
ENGINEERING SERVICE**

**COMPLETE  
IN-STOCK SELECTION**

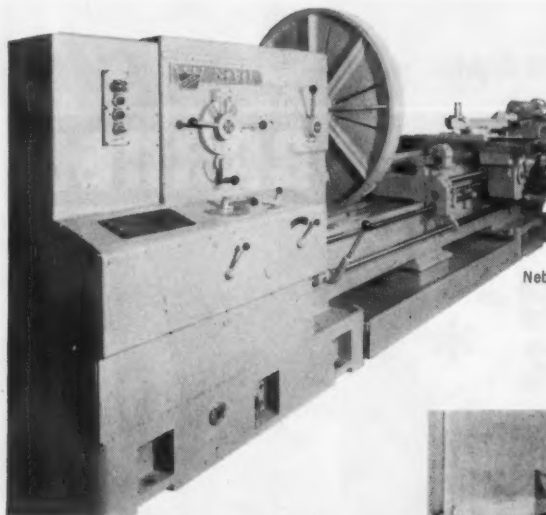
**PROMPT DELIVERY**

**WHITMAN & BARNES**

**DRILLS  
and  
REAMERS**

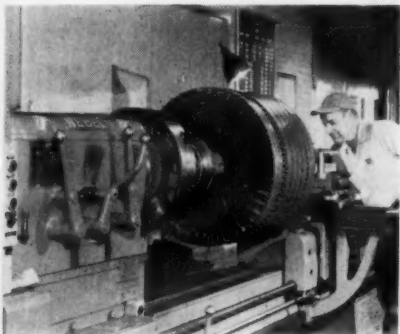
**40050 PLYMOUTH ROAD • PLYMOUTH, MICHIGAN  
NEW YORK • CHICAGO • LOS ANGELES**

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Nebel XB 20"/40" series

Nebel G 28"/50" series

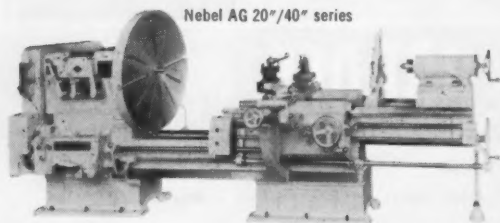


**any Nebel extension  
bed gap lathe will do  
the work of 2 standard  
lathes at half the cost!**

Would you like to have a lathe with the swing capacity of both a 40" lathe and a 20" lathe . . . at half the cost of a 25" heavy duty? You can, with the Nebel XB 20"/40" (upper left).

The other two Nebel extension bed gap lathes shown here, the G 28"/50" and the AG 20"/40", offer equally useful capacity at attractive initial cost savings.

Why buy 2? . . . one Nebel will do. Write, wire or phone for prices and delivery on these double duty lathes. Nebel Machine Tool Corp., 3409-A Central Parkway, Cincinnati 25, Ohio.



Nebel AG 20"/40" series

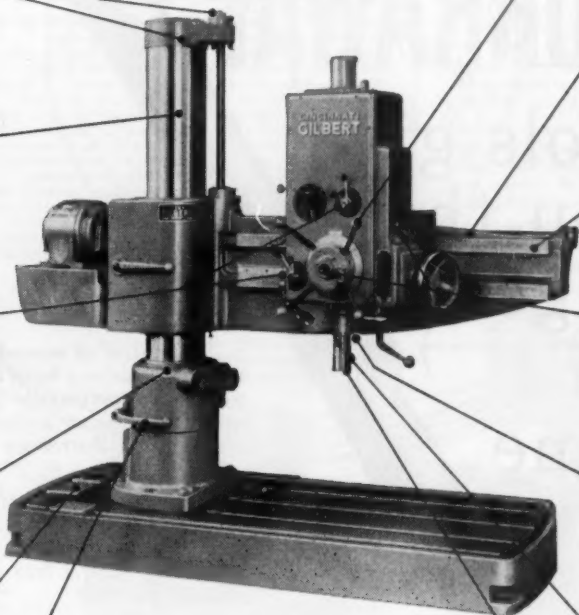


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# ONLY GILBERT RADIALS

## OFFER ALL THESE FEATURES

When you order a Cincinnati Gilbert radial, you get more new features per dollar than any other radial can offer. And every feature is designed to give you maximum return on your investment—in performance, productivity, and dependability.



Safety elevating nut protects both operator and machine

Weight carried on opposed Timken bearings

Hardened column available

Direct-reading speed and feed shifters; gears counterbalanced for easy shifting

Adjustable ball bearing rollers on hardened ring for maintained rigidity

Long heel on heavy base provides 360° stability

Powerful, accurate electric column clamp available

Four-lever turnstile cuts machine handling time

Balanced arm resists torsion, compression, tension forces

Head rides on anti-friction bearings; clamps three surfaces

When disengaging positive feed clutch, spindle won't drop

Full spindle support near tool; runout is less than .001"

Hardened tang slot is an exclusive Gilbert feature

You can always see the spindle; get extra use of spindle travel

And don't overlook these additional features:

- wide range of spindle speeds for efficient tool performance;
- hardened gears throughout the machine;
- standard or special tap leads available;
- modern styling which reduces housekeeping, convinces customers that your shop is up-to-date.

Write or call for Bulletin 349.

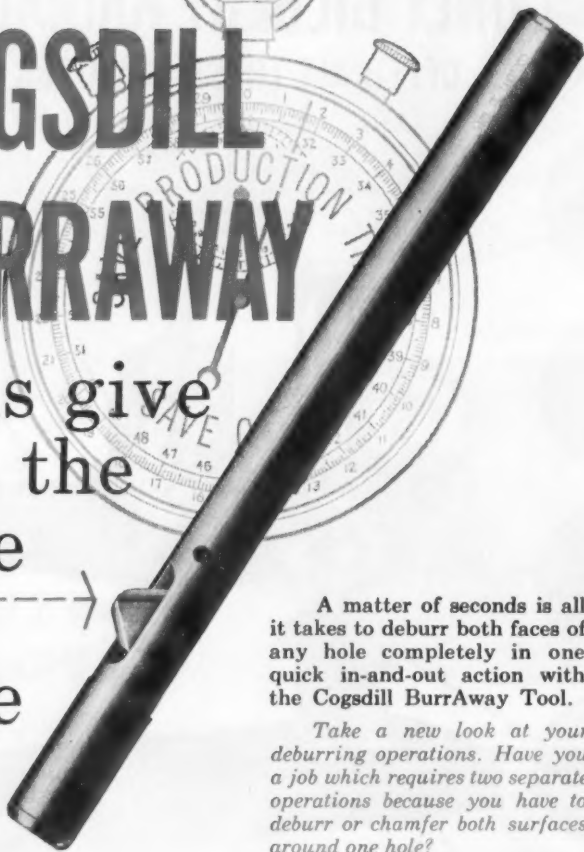
*those who buy Gilbert buy Gilbert again*

THE CINCINNATI GILBERT MACHINE TOOL CO.  
3348 BECKMAN STREET, CINCINNATI 23, OHIO

For more data circle 338 on Postpaid Card

# COGSDILL BURRAWAY

tools give  
you the  
edge  
on  
time



A matter of seconds is all it takes to deburr both faces of any hole completely in one quick in-and-out action with the Cogsdill BurrAway Tool.

*Take a new look at your deburring operations. Have you a job which requires two separate operations because you have to deburr or chamfer both surfaces around one hole?*

Call our local representative to show you how this BurrAway Tool can be used in your particular equipment, to give *you* the edge on time.



## Cogsdill

TOOL PRODUCTS, INC.

12980 W. Eight Mile Road, Oak Park 37, Michigan

For more data circle 339 on Postpaid Card

# GET **GORTON** *and you* GET ALL THIS . . .

TOOL ROOM  
*accuracy* with

**HEAVY DUTY PERFORMANCE**  
... resulting in immediate economy!

**Features you should demand** ... Square lock bearing guides with long length-to-width ratio between column and knee and saddle; spindle motor drives spindle only with separate feed motor; designed for high-speed steel or carbide milling, either conventional or climb milling; dial-type horsepower load meter for spindle; interchangeable assembly unit construction; 100% mechanical and electrical overload protection for gears, cutter and work; removable coolant pan for easy clean-out and quick coolant change; unique spindle bearing cooling system — heat is dissipated and dispersed throughout column. Gorton *verticals* are also available for aircraft work with high cycle spindles and rapid table feeds; *horizontal models* can be had with super-speed vertical spindle head and ram assemblies. For high production, specify Gorton automatic cycling.

**Special tooling and machines** ... Gorton specializes in custom-built tooling to convert standard models into special purpose machines, as well as the design and manufacture of high production, single purpose machines to precision standards. Ask us for our recommendations.

More usable power at the Spindle than in any comparable machine, due to superior gear train design.

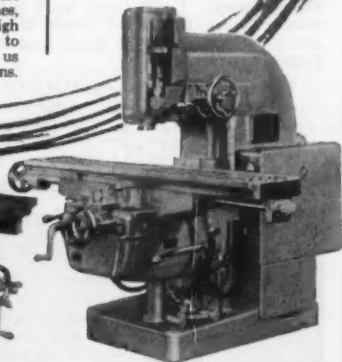
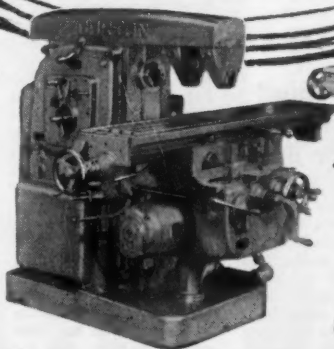
**PROOF** ... check your stock removal against horse power consumed ... a real test for any milling machine.

When you buy "Horse power," be sure it is usable horse power.

89

## COMBINATIONS

Plain-Type Mills  
Universal Mills  
Vertical Mills  
56" Tables  
62" Tables  
76" Tables  
28" Table Travel  
34" Table Travel  
48" Table Travel  
7½ to 25 H. P.  
Speed Ranges according to requirements  
Feed Ranges according to requirements



\* Ask for the following bulletins: 1712-2321, 2407, 2584, 2585 and 2691-A



**GEORGE GORTON MACHINE CO.**

1712 RACINE STREET

RACINE, WISCONSIN

SINCE 1893

Tracer-Controlled Pantographs, Duplicators — standard and special ... Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

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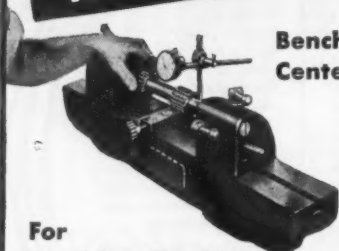
A7-1006-1PA

December, 1957

modern machine shop 39

# Time Saving Production and Checking Accessories

Here are three Sundstrand accessories that may prove helpful in your work. A wide range of bench centers and balancing tools are available for checking purposes. The automatic index base has proved a sound addition to many metal working machines. Write for further information.



**Bench  
Centers**

## For Precision Checking

Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

### COMPLETE RANGE AS FOLLOWS:

6" x 18"	12" x 48"	24" x 48"
6" x 36"	12" x 60"	24" x 60"
12" x 36"	12" x 72"	24" x 72"

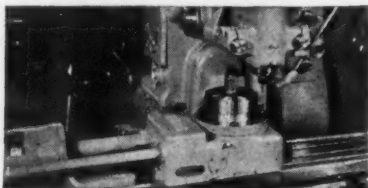
## Balancing Tools For Small Medium or Large Work



Sundstrand offers a complete line of balancing tools which will save their cost quickly on truing or balancing operations. Accurately sensitive and durable, they provide a simple, reliable means

for checking the balance of parts like gears shafts, fly wheels, pulleys, etc. Standard swing sizes range from 21 inches up to any swing desired. Length between standards ranges from 20 inches to any length desired.

## Automatic Index Base For More Production



This automatic index base is designed so there is no strain against the index plunger during the cut. The base is locked by powerful clamping so that accuracy of index is not affected by heavy cuts.

In many cases, the addition of this Automatic index base has increased milling production enough to eliminate need for the purchase of additional machinery. It may be the answer to your milling production requirements. Call in a Sundstrand engineer. There is no obligation for this.

## Free Data

Complete specifications are available on these three time saving accessories. Write for your copies today. Ask for bulletin 586.

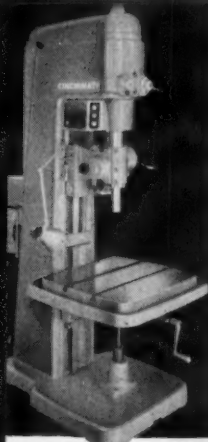


# SUNDSTRAND MACHINE TOOL CO.

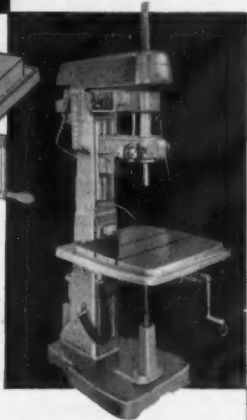
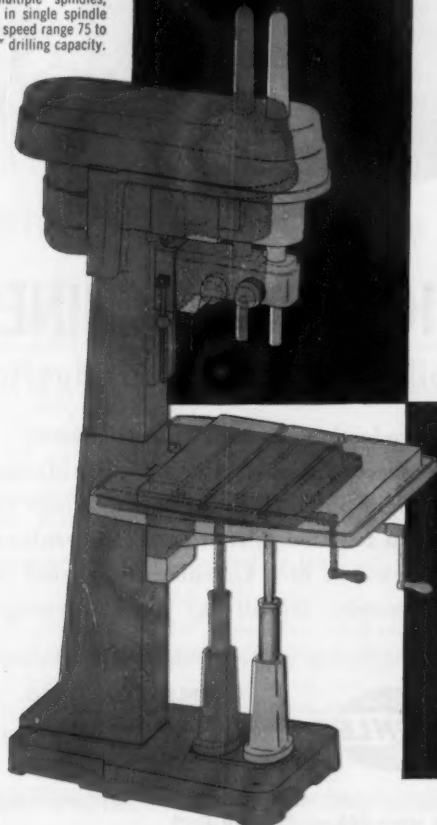
2539 ELEVENTH ST. ROCKFORD, ILLINOIS, U.S.A.

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Heavy Duty Floor Drills in 21" and NEW 25" sizes. Box column in single and multiple spindles, standard column in single spindle only. Standard speed range 75 to 530 rpm. 1½" drilling capacity.



Medium Duty Drills in 16" and NEW 24" sizes. Bench and floor models, single and multiple spindle. Standard speed range 390 to 3100 rpm, 1" drilling capacity. 24" size has new larger work table.

NOW... **4** sizes to  
choose from!

# CINCINNATI

## SLIDING HEAD DRILLS

Greater throat capacity has been added to Cincinnati's industry-proven 16" and 21" Sliding Head Drills... the Medium Duty Drills are now built in both the familiar 16" and the NEW 24" sizes, the Heavy Duty models in 21" and NEW 25".

All of the proven features are in all four sizes—geared power feeds, positive stop and automatic feed disengage, sturdy box construction, and many others—giving you the ease of operation, high accuracy and stability of drilling machines that cost far more.

Investigate how you can speed up and improve your drilling operations with these new Cincinnati Sliding Head Drills. See them and get all the facts at your local CL&T Dealer. Or, write direct.

CINCINNATI LATHE AND TOOL CO.,  
3207 Disney St., Cincinnati 9, Ohio.



center on

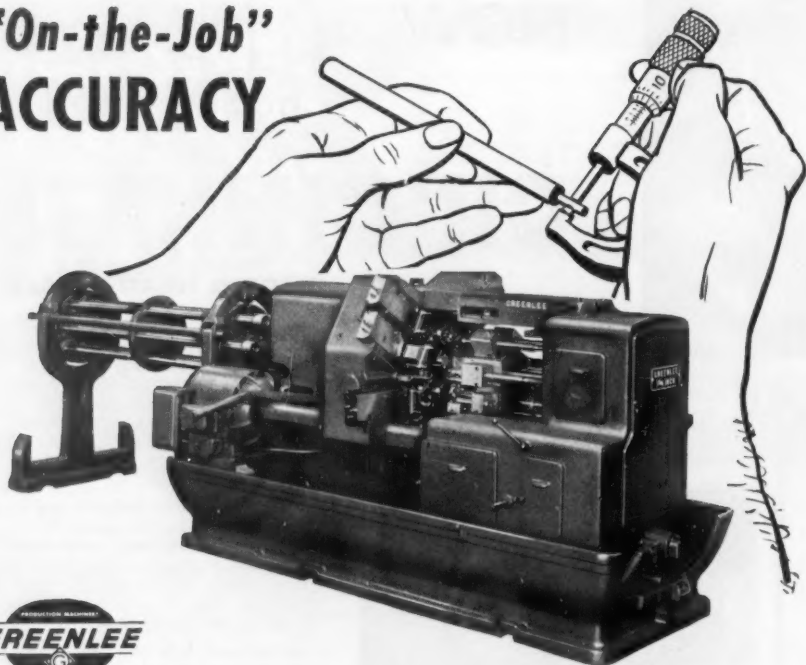
cincinnati lathes and drills

ENGINE, TOOLROOM, TRACER AND FIXED GAP BED LATHES AND A COMPLETE LINE OF DRILLING MACHINES

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**"On-the-Job"**  
**ACCURACY**



## **AUTOMATIC BAR MACHINES**

**Greater Dependability . . . Faster Production**



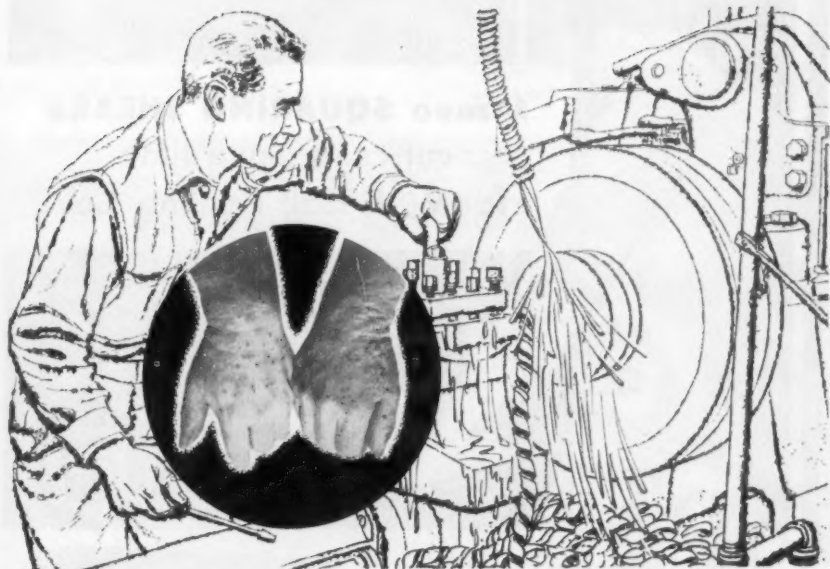
Write today for Catalog A-405, first step on the way to more profitable production with Greenlee Automatic Bar Machines.

Modern production demands greater accuracy . . . at greater speeds. Greenlee Automatic Bar Machines maintain rigid production schedules and hold each piece within required tolerances. Let Greenlee engineers show you how Greenlee Automatics save time and money. It will pay you to investigate.



**GREENLEE BROS. & CO.**  
**1892 Mason Avenue**  
**Rockford, Illinois**

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## Why DERMATITIS is a needless penalty

Dermatitis caused by the oils, greases and abrasives used in machine shop work can be prevented. Simply. Inexpensively. With a basic program that safeguards and improves the hygiene of workers—the West Program of Dermatitis Prevention and Control.

How does it work?

No contributing source of dermatitis is overlooked. Specially formulated handcleaners insure personal cleanliness. Antiseptic creams help protect exposed skin areas. "Vinylite" aprons and armguards prevent clothing contamination.

Other specialties protect against bacteria infections.

Workers are protected against discomfort, lowered morale and lost time.

Management is protected against the costs of medical care, absenteeism, replacement training, sacrificed quality and lost production.

Why not discuss the West Program of Dermatitis Prevention and Control with one of our specialists? His recommendations will help you eliminate the needless penalty of dermatitis. No obligation of course. Just send the coupon.

Programs and Specialties  
for Protective Sanitation  
and Preventive Maintenance



WEST DISINFECTING DIVISION

### WEST CHEMICAL PRODUCTS INC.

42-16 West Street, Long Island City 1, N. Y.

Branches in principal cities

In Canada: 5621-23 Casgrain Ave., Montreal

- ☐ Please send your 24 page booklet on dermatitis control.  
☐ Please have a West representative telephone for an appointment.

Name \_\_\_\_\_

Position \_\_\_\_\_

Mail this coupon with your letterhead to Dept. 16

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December, 1957

modern machine shop 43



**famco SQUARING SHEARS**  
cut costs, save time  
for W. F. Hall Printing Co.

Cutting electrotypes apart is a simple and money saving matter at W. F. Hall Printing Co. (Chicago) since they bought a Famco Squaring Shear. Previously, electrotypes were cut on a bench saw, however, this operation was both dangerous (due to flying metal) and time consuming.



Famco Squaring Shears, in your plant, can save you production time and money too.

Famco has 18 models to select from—power, foot or air—with cutting widths 22 to 72 inches and capacities to 14 gauge. And with Famco Shears you get four times more cutting life because the knives are four edged and reversible.

Find out about the hi-quality Famco Squaring Shears today!



Write for **FREE Famco Squaring Shears catalog today.**



**famco machine company**

3122 SHERIDAN ROAD • KENOSHA 12, WISCONSIN

AIR PRESSES • ARBOR PRESSES • BAND SAWS • DRILL PRESSES • FOOT PRESSES • POWER PRESSES • SQUARING SHEARS • MILLING MACHINES

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# Natco Naturals

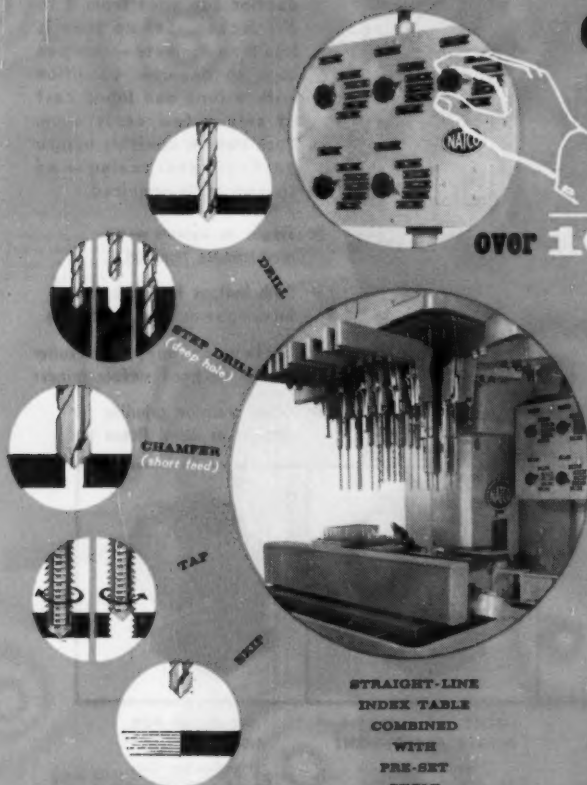
*Cost-Cutting Ways*

*You Can Use*

*Standard Multi-Spindle Natcos*

Any time your parts require machining *more than one hole*—drill, bore, face or tap—it may well be a "Natco Natural." Your standard Natco will produce substantial savings in a surprising number of situations, *even in small job-shop lots!* Call in your nearby Natco field engineer; he'll tell you in short order whether you've got a "Natco Natural" there.

## NOW...Set up quickly with a twist of the wrist



**5 cycles**  
**5 positions**  
**over 100 combinations**

The five-position table mounted on a Natco H-6 adjustable spindle machine equipped with selector control panel makes it possible for the operator to pre-set over 100 machining combinations. Thus the capacity of the machine is greatly increased in number of holes, in complexity of hole patterns, and in variety of machining operations. Machine investment is kept at a minimum for the volume of work produced.

### Select either of

- 2** DEPTHS OF FEED  
automatically
- 2** FEED RATES  
automatically
- 2** MOTOR SPEEDS  
automatically
- 2** INDIVIDUAL SPINDLE  
SPEEDS PLUS NEUTRAL

STRAIGHT-LINE  
INDEX TABLE  
COMBINED  
WITH  
PRE-SET  
CYCLE  
SELECTOR

Standard multi-spindle Natcos range from 1 hp, 10-spindle machines to 50 hp machines with up to 72 spindles. Spindles in standard Natcos are driven through universal joints and located by either adjustable arms of bored slip plates.



**National Automatic Tool Company, Inc.**

Richmond, Indiana

Multi-spindle drilling, boring, facing & tapping machines. Special machines for automatic production.

Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.



**NEW**

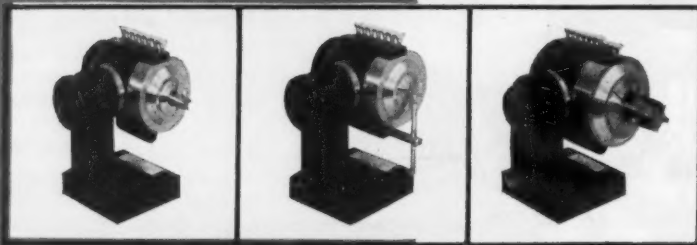
## *Rocket* **TAP SHARPENERS**

handle ALL tap sizes



New **ROCKET** Tap Sharpeners handle all production tap sizes from 0 to 2 1/4 inches. Set-up time is less than a minute—sharpen taps to like-new condition with a time and labor cost of only a few cents each. Push button controls assure accurate sharpening—no special skills required.

- ▶ Simple to operate—no maintenance required
- ▶ Push buttons for quick, easy indexing—no cams to change
- ▶ Can be used on any tool and cutter grinder or small surface grinder
- ▶ Gives precision grinding for straight or spiral fluted taps



**MODEL 50 FOR  
2-3-4 FLUTE TAPS**

Handles tap sizes  
from 0.32 to 1-1/16 inches

**MODEL 50 WITH F-1  
FINGER ATTACHMENT**

Handles tap sizes  
from 0 to 1-1/16 inches

**MODEL 60 FOR  
4-5-6 FLUTE TAPS**

Handles tap sizes  
from 1 to 2-1/4 inches

**other flute combinations available on special order**



write for further information  
**ROCKFORD DIE & TOOL WORKS, INC.**

1816 Seventeenth Avenue • Rockford, Illinois

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# SET KNIFE CLEARANCE AT 8% OF METAL THICKNESS



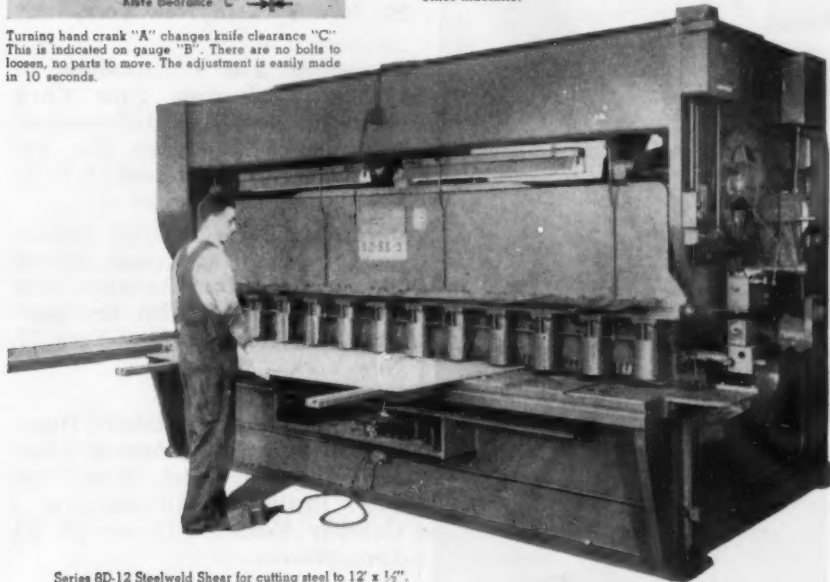
Turning hand crank "A" changes knife clearance "C". This is indicated on gauge "B". There are no bolts to loosen, no parts to move. The adjustment is easily made in 10 seconds.

**8%** is a good figure to remember when shearing mild steel. By adjusting the clearance between the knives to 8% of the thickness of steel being cut, you will get the best cuts and the knives will stay sharp longer.

Because of the importance of having the right knife clearance for every shearing job, Steelweld Shears were designed to make this adjustment extremely easy. In fact, it can be made in 10 seconds. Consequently, it becomes a natural routine part of a shear operator's job.

You will find this feature invaluable if you shear various thicknesses. It eliminates the need of working with some fixed compromise knife clearance setting with resultant cuts that vary from the ideal more or less as the knife adjustment is off from the correct setting.

Steelweld Shears are the most modern on the market today with more features that make for speed, accuracy and long trouble-free operation. Some of their fine features are not obtainable in any other machine.



Series 8D-12 Steelweld Shear for cutting steel to 12' x 1/4". A stainless steel plate 7' x 3/4" is shown being cut. Various thickness plates, as well as heavy steel grating, are also cut on this machine, which is in a West Coast plant. Knives on this hard-working shear last 3 to 6 months before they need to be turned to another cutting edge.

Write for free copy of Catalog No. 2011  
Gives construction and engineering details

## STEELWELD PIVOTED BLADE SHEARS

THE CLEVELAND CRANE & ENGINEERING CO. • 6454 E. 282 ST. • WICKLIFFE, OHIO

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December, 1957

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# TREPANS

▶ **Maximum Diameter— $\frac{5}{8}$  inch.**

▶ **For fast-production, multi-spindle machines.**

▶ **Specially heat-treated, high speed steel.**

▶ **With back taper or radial relief.**

▶ **Made by specialists in the design of small tools.**



**WOODRUFF & STOKES CO.**  
INCORPORATED

Bldg. 32, 357 Lincoln St., Hingham, Massachusetts  
For more data circle 349 on Postpaid Card

48 modern machine shop

## Meetings

### Important Meeting

#### Dates

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

**December 1-6** • American Society of Mechanical Engineers, Annual Meeting, Hotel Statler, New York. Society headquarters: 29 W. 39th St., New York 18, New York.

**December 2-6** • Exposition of Chemical Industries, New York Coliseum, New York. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

**December 5-7** • National Association of Manufacturers, Annual Meeting, Waldorf-Astoria, New York City. Association headquarters: 2 E. 48th St., New York 17, New York.

**December 10-11** • Material Handling Institute, Inc., Annual Meeting, Biltmore Hotel, New York City. Institute headquarters: 1 Gateway Center, Pittsburgh 22, Pennsylvania.

**January 27-30** • Plant Maintenance and Engineering Show, International Amphitheatre, Chicago. Information: Clapp and Poliak, Inc., 341 Madison Ave., New York 17, New York.

December, 1957

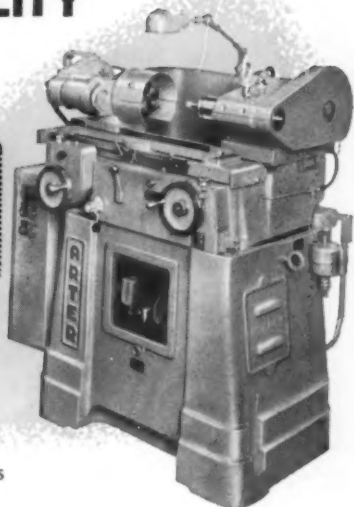
# FOR LOW COST GRINDING VERSATILITY

*it's smarter to use*

# ARTER

## MODEL 103 INTERNAL-EXTERNAL GRINDER

with interchangeable wheelheads



Arter Model 103 dual-purpose Grinder provides you with maximum grinding versatility to help lower production costs. Now, there's no need to buy two machines for internal and external grinding when the economy-priced Arter 103 handles both operations quickly and efficiently. It's a smart investment if you have a variety of operations in tool room or production work. The Model 103 is also useful to supplement larger machines when work piles up.

### FEATURES

- Completely hydraulic movement of table and wheelhead — both can be swiveled for angular work.
- Centralized push-button controls enable the operator to make fast selection of desired operations.
- Heavy-duty cast iron base reduces vibrations.
- Interchangeable wheelheads for internal and external grinding. Both wheel-head spindles are mounted in lifetime lubricated ball bearings. Internal wheelhead is bored 3" to take quills of either 15,000 or 32,000 RPM.
- Diamond dresser with graduated dial is standard equipment.
- Can be purchased as external grinder only, EG-103 or as internal grinder only, IG-103.

## ARTER GRINDING MACHINE COMPANY

Manufacturers of Rotary Surface, Internal,  
External Grinders and Sigmatic Positioning Tables.

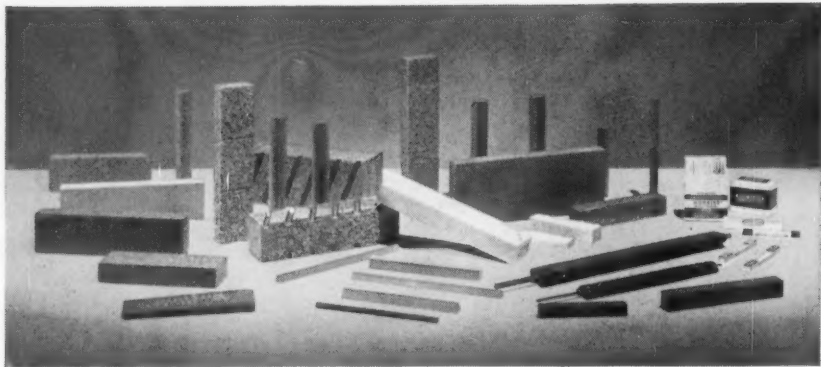
15 SAGAMORE ROAD, WORCESTER 3, MASSACHUSETTS

For detailed information see your  
Arter Representative or write for  
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December, 1957

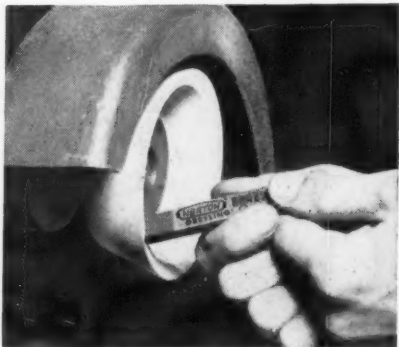
modern machine shop 49



## Handy, money-saving "First Aids"



For many wheels a **CRYSTOLON\*** dressing stick does an excellent job in maintaining a uniform cutting surface. With each different type of the famous Norton diamond wheels, for example, a CRYSTOLON stick is supplied in the right degree of hardness for best results in dressing. **ALUNDUM\*** sticks are excellent for smoothing die areas, and Norton BF sticks of ALUNDUM abrasive, reinforced with cotton fiber, are often preferred for breaking edges, hand finishing molds and other small parts.



A **NORBIDE\*** dressing stick takes no time, practically, to touch up a cup or saucer wheel, clean up a wheel face, or form a radius or groove. Just a couple of passes is all you need, in fact, because this outstanding Norton development is next to diamonds in hardness, costs only a fraction of diamonds, and outlasts hundreds of ordinary sticks.



**Hardest of all is the Norton diamond hone.** Here a vitrified diamond hone is working on the side cutting edge and nose radius of a carbide tipped tool. Honing lightly at a 45° angle is worthwhile protection when the carbide is used for making heavy cuts in steel, since steel scale and chips may cause an extremely sharp edge to flake off.



**Cleaning up castings with a CRYSTOLON brick** is a quick and handy way to remove sand, scale and parting lines. Bricks of this fast-cutting abrasive are made in a wide range of sizes and shapes, plain surfaced or slotted. They're also highly valuable in a variety of plant maintenance operations, such as smoothing off concrete foundations, walls, or other masonry jobs.



**Core files are useful for shaping and smoothing sand cores** for hollow castings. Like the Norton bricks they're made of CRYSTOLON abrasive, which gives them the same fast cutting action. And because of their long, slender shapes they're reinforced with metal rods, for added strength and ease of handling.

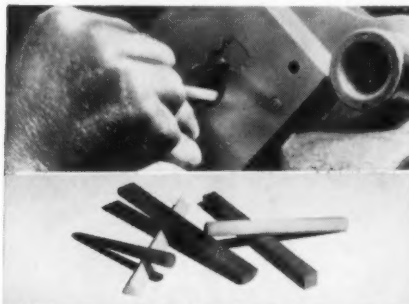
## for plenty of plant jobs

*Norton bricks, sticks, hones, core files, keep many of your tools, products and equipment in top condition*

With Norton bricks, sticks and other hand-operated smoothing implements, you can simplify many everyday plant jobs. You can cut time and expense, too, because you eliminate adjusting or run-

ning any machines. Ask your Norton Distributor about all the advantages. Or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors all around the world.

W-1827



**Behr-Manning Division files** provide excellent honing of dies, as well as sharpening. The file in action is an **INDIA** oilstone. Below, other Behr-Manning oilstone files include **INDIA** point, half-point and square shapes, and **ARKANSAS** triangle and round shapes.

**NORTON**  
ABRASIVES

*Making better products...  
to make your products better*

#### NORTON PRODUCTS

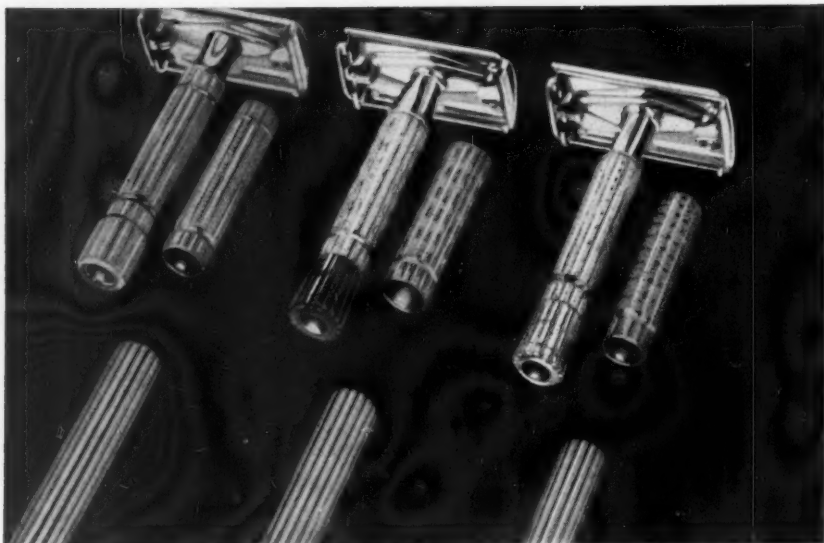
Abrasives • Grinding Wheels • Grinding Machines  
Refractories

#### BEHR-MANNING DIVISION

Coated Abrasives • Sharpening Stones  
Behr-cat Tapes

\*Trade-Marks Reg. U. S. Pat. Off.  
and Foreign Countries

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Handles for the gold-plated (left) and standard "Heavy" (center) Gillette safety razors are made from Anaconda leaded commercial bronze special-shape seamless tube, .4525" O.D., .371" I.D. "Regular" model (right) is of commercial bronze .395" O.D., .324" I.D.

## Gillette shaves costs with Anaconda special-shape tubes

**The problem:** The Gillette Safety Razor Company, Boston, Mass., formerly used drawn shells for the handles of its famous line of razors. Press-fit assembly of components called for very close tolerances and suppliers of the drawn shell had difficulty in controlling the dimensions to the accuracy required. Rejects and production delays were becoming a costly problem to Gillette, and there was also excessive waste of material in trimming the shells after the knurling, grooving and rolling operations.

**The solution:** American Brass Company representatives suggested the use of special-shape (fluted) tubes to meet the tolerances required—in alloys suitable for the machining operations. Gillette tried the idea and now uses Anaconda special-shape tubes for handles of three models.

Long lengths of the tube are fed into high-speed, multiple-spindle machines which automatically convert the tube to razor handles ready for the plating room. Production is greatly increased, rejects and waste material are reduced to a minimum, and the uniformity of the handles simplifies assembly. Most important of all to the Gillette Safety Razor Company is the improved quality of the finished product.

**Save Material and Production Costs:** Special-shape seamless tubes—of copper, copper alloys or aluminum—in standard lengths, or cut to specified lengths, can save several steps in arriving at a finished product. The American Brass Company's French Small Tube Division are specialists in producing small tubes (up to  $\frac{1}{2}$ " O.D.) of special design and, in addition to maintaining a wide range of stock dies, are ready to cooperate fully in the development of new shapes to meet specific requirements.

**For Action:** Contact our nearest District Sales Office or send a sample, drawing or description, estimated quantity, kind of metal required and other pertinent data to: The American Brass Company, French Small Tube Division, Waterbury 20, Conn.

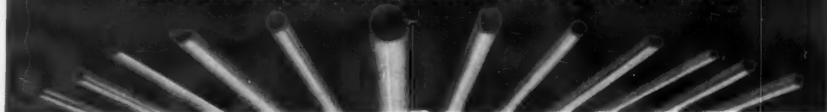
8702

# ANACONDA®

## SPECIAL-SHAPE TUBES

Made by The American Brass Company

**SPECIAL-SHAPE TUBES IN LONG LENGTHS OR CUT UP—  
IN COPPER, BRASS, BRONZE, NICKEL SILVER, ALUMINUM**



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# modern machine shop

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**modern machine shop**  
431 Main St. Cincinnati 2, Ohio

December, 1957

# What is your LUBRICATING PROBLEM?

- ☐ LATHE CENTER LUBRICATION  
SCORING-GALLING
- ☐ GRINDING CENTERS  
LUBRICANT WASHOUT
- ☐ DRAWING  
SCORE MARKS-DIE WEAR
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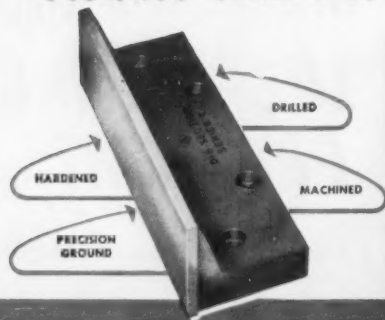
CMD Lube has solved many like it with excellent results. Perhaps CMD will be your answer, too!

**CHECK AND  
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SAMPLE**

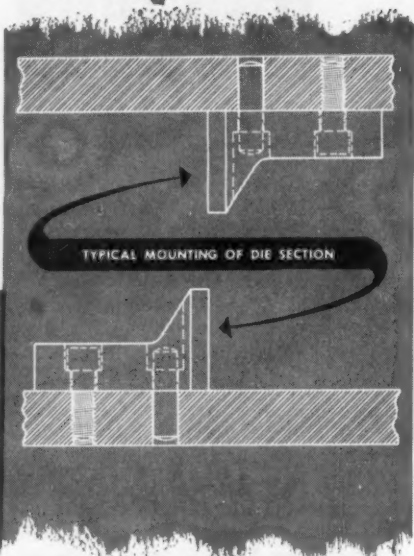
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**CHICAGO MANUFACTURING  
AND DISTRIBUTING CO.**

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# Reduce Your Die Building Time...



  
**Standardized  
Die Sections**



**Standardized Die Sections** manufactured by R-B eliminate all of your machining, drilling, hardening and grinding. For, these die sections are entirely prefabricated and ready for mounting on your die shoes . . . they will substantially reduce your die building time.

**Series A, B & C** die sections have cutting edges of tool steel which are hardened and precision ground. Bases are of mild steel to permit drilling of dowel pin holes.

**Series AA, BB & CC** die sections are not hardened, have wider lands and are of the same general construction as series A, B & C. These extra wide lands permit contouring before hardening. Die sections in both series are available in various lengths and heights.

**TOOL STANDARDIZATION** is the basis for saving production time. With R-B you get the accepted standard of the sheet metal industry—in standard design features that save in engineering, die construction and operation.

*Use R-B Engineering Service for Your Piercing Problems*



**RICHARD BROTHERS PUNCH DIVISION**

**ALLIED PRODUCTS CORPORATION**

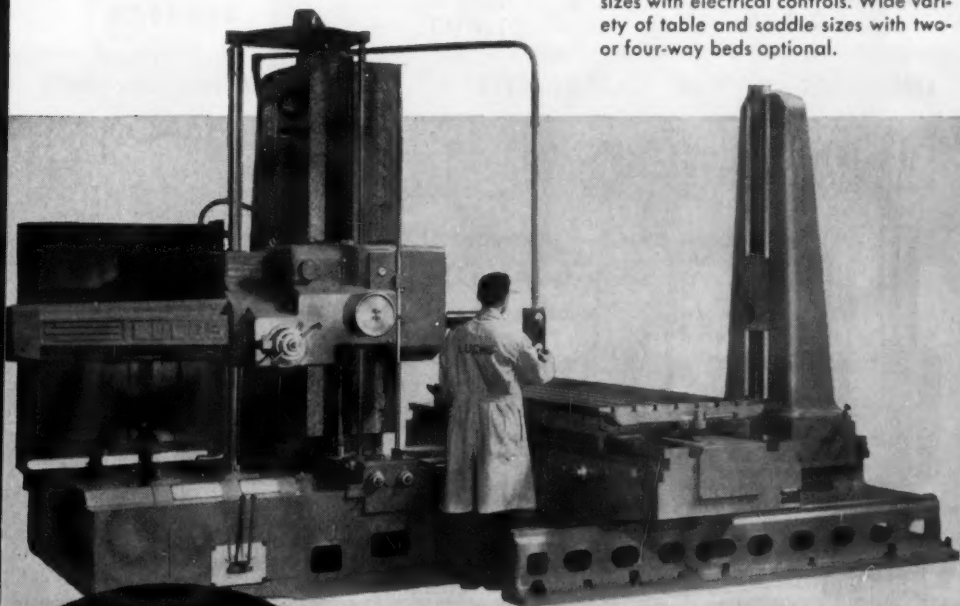
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# there's always work for a Lucas

Extreme accuracy, feather-touch pendant control, automatic power positioning for repetitive work make a Lucas the most useful machine in any shop. There's a model and size for *your* horizontal boring, drilling and milling operations. Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland 8, Ohio.

A complete range of models, built in 3", 4" and 5" spindle sizes with mechanical controls and in 4", 5" and 6" sizes with electrical controls. Wide variety of table and saddle sizes with two- or four-way beds optional.



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OF  
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a division of  
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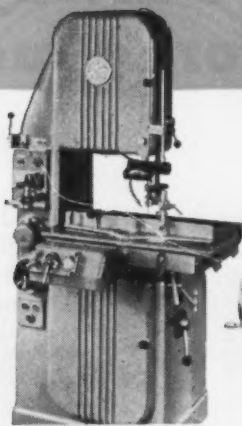
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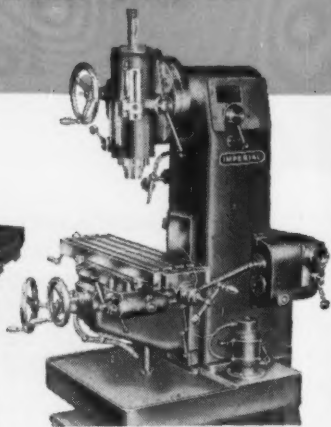
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Fine Precision Boring Machines  
**\$2,495.**



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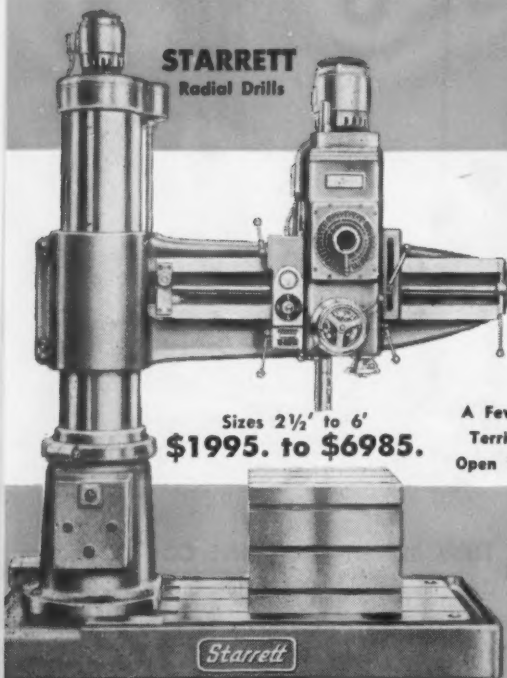


**IMPERIAL**  
VERTICAL MILLING MACHINE  
**\$1,440.00**

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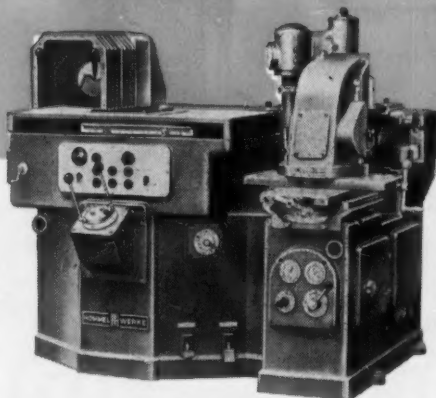
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Radial Drills



Sizes 2½' to 6'  
**\$1995. to \$6985.**

A Few Exclusive  
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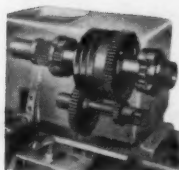
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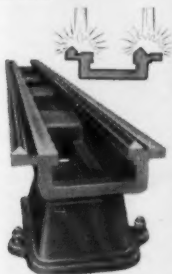
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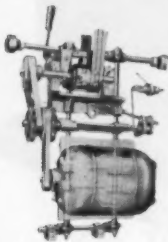
**Walker 5-8300**



**TIMKEN "ZERO-PRECISION" TAPERED ROLLER BEARINGS** assure precision performance and long accuracy life. 3 V-belts drive spindle, up to 1 1/2 HP motor.



**FLAME HARDENED BED WAYS** — a long-service-life feature that is standard equipment at no extra cost.

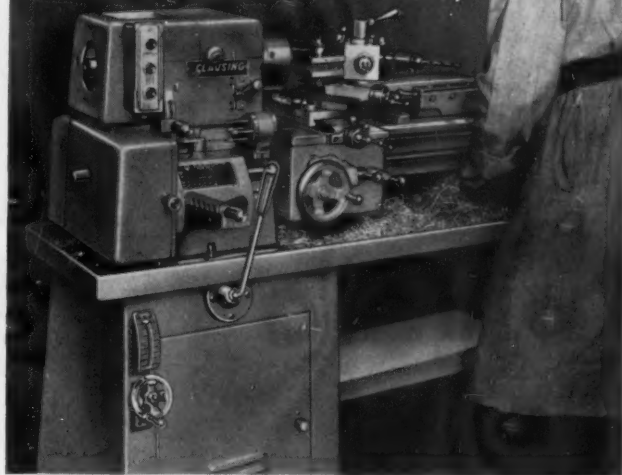


**VARIABLE SPEED COUNTER-SHAFT** increases production on all operations requiring a variety of spindle speeds. Any speed between 35 to 270 RPM and 210 to 1600 RPM is instantly available. Brake permits instant stops, starts.

#### HERE'S PROOF OF PERFORMANCE:

"The Clausing 5400-series lathes are dependably accurate and have more stamina than other lathes of comparable size. They're the biggest lathe value we've found to date!"

ELRA CORPORATION



### "Dependably accurate — have more stamina, CLAUSING 5400-series LATHES are the biggest lathe value we've found"

This reaction to Clausing 5400-series 12 3/4" lathes is typical of reports from users everywhere. Here are a few reasons why —

"Dependably accurate" — Heavy spindle turns on Timken "Zero-Precision" tapered roller bearings. Bed ways are flame hardened, precision ground. Automatic apron has oil bath lubrication. Accuracy is *verified* by test report with each lathe.

"More stamina" — Has massive bed, headstock, apron, tailstock — forged steel spindle — three V-belts driving spindle pulley — heavy-duty variable speed drive. *More "beef" throughout.*

Get all the facts, compare, and you, too, will find Clausing "the biggest lathe value!"

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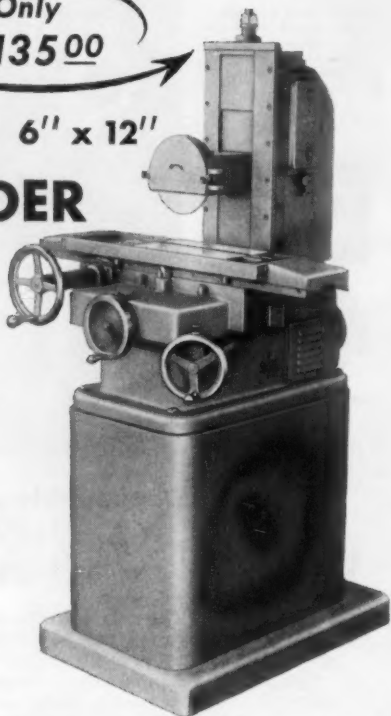
The **FIRST** low cost  
**SURFACE GRINDER**  
to give you all these  
**BIG MACHINE ADVANTAGES**

Only  
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## COVEL

**NO. 7A 6" x 12"**  
**SURFACE GRINDER**

1. **Time-saving controls** — elevating hand wheels, traverse feed and table feed all grouped conveniently at waist-high level. No reaching overhead.
2. **Chrome table ways** — insure long-lived accuracy, do not require periodic re-scraping.
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5. **Extra engineered weight** — compare Covels 855 lbs. of engineered weight with other 6" x 12" machines. (Extra "beef" is in the base and vertical column where it counts!)



No other low-cost surface grinder gives you so much for so little! Ideal for the small tool shop, yet rugged enough for many production jobs. A profitable investment even if you use it only occasionally.

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**COVEL** | **PRECISION GRINDERS**  
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COVEL OFFERS THE WIDEST  
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UP TO 14"x24". CUTTER AND  
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When storm clouds gather  
... turn fast to



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rate Drill Jig Bushings.  Bushings hold dimensional accuracy longer because they're made of chrome bearing steel. **You get them faster, too** . . . "same day" shipment on all cataloged standard sizes. Custom orders receive special custom service. Eight conveniently located warehouses to serve you better. Write today!

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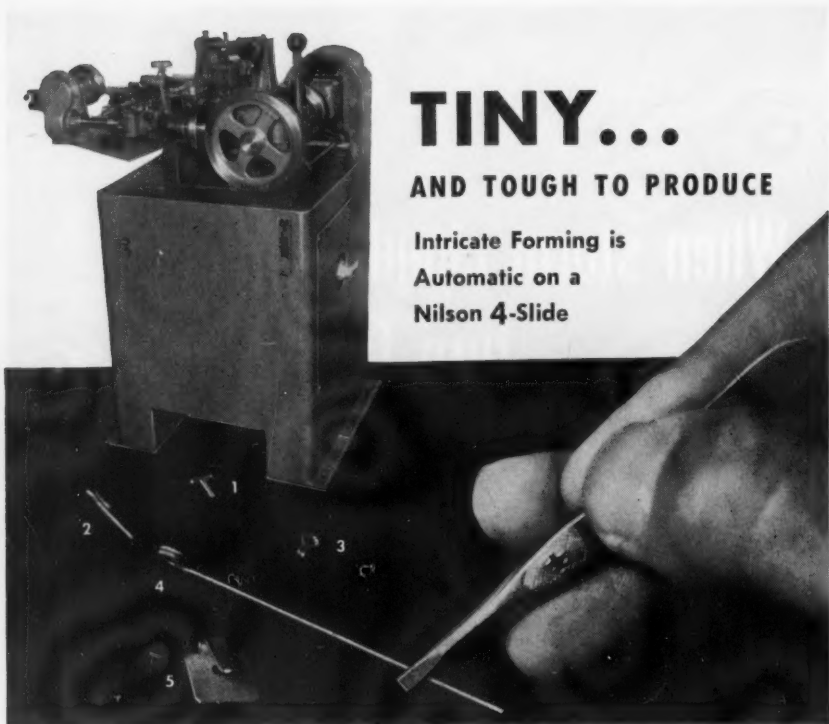


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# TINY...

## AND TOUGH TO PRODUCE

Intricate Forming is  
Automatic on a  
Nilson 4-Slide

Small wire and ribbon metal forms shown here in actual size are typical examples of modern precision production on a Nilson #00 4-Slide. Compact in size, this 4-Slide produces up to 375 pieces per minute in material not exceeding .040 dia. and 3" in blank length. Easily access to tooling, accurate feeding to within .003, and rugged construction assures years of precision forming.

**1 Mercury Switch Part** . . . .014" x .019" platinum wire, formed with tolerances within .001" on over-all length. Production rate, 175 per minute.

**2 Electrical Contact** . . . .0076" x .0030" wide phosphor bronze formed at a production rate of 200 per minute.

**3 Swivel Part** . . . .025" brass wire. Heading operation includes eye formed with tolerances within .008", shank within .003 tolerance. Production rate, 300 per minute.

**4 Leadwire** . . . .026" soft tinned copper wire formed at a rate of 140 per minute with two 7/64" diameter windings.

**5 Contact Part** . . . .010" x 3/8" wide phosphor bronze formed at 175 per minute.

**A.H. NILSON**  
**MACHINE COMPANY**

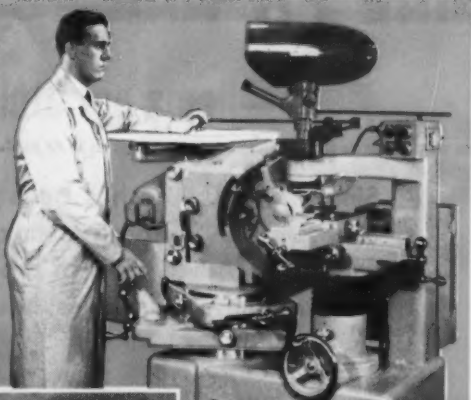
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Automatic Chain Making Machines • Staple Forming Machines • Wire and Stock Reels • Wire Straightening Equipment • Slide Feeds for Presses • Wire and Ribbon Stock Forming Machines

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*Grind* High Precision  
Profiles Directly  
from the Drawing  
*with*  
**SHEFFIELD'S  
MICRO-FORM  
GRINDER**



### FEATURES

- Grinds both flat and circular profiles
- No restrictions on profile intricacy
- No templates needed
- Perfect toolroom accuracy
- Saves up to 75% on profile work
- Final accuracy checked while work is still on the grinder
- Accuracy not affected by wheel wear
- No special wheel dressing required as wheel can be set at any angle—fewer wheels are needed
- Diamond impregnated wheels used in grinding carbides last longer—no waste as no special dressing is required
- Multiple work parts ground simultaneously
- Grinds any material including carbides
- Controlled by 50:1 pantograph and 30 power scope and viewing screen

**The Sheffield Corporation**  
Dayton 1, Ohio, U.S.A.

*the* **SHEFFIELD** *corporation*  
of Bendix Aviation Corporation  
manufacture and measurement for mankind

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For full details and specifications ask your Sheffield representative for Bulletin MFG-122-51 or write us direct.

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## FINE CUTTING TOOLS

by *Eclipse*

Since 1913 Eclipse has been consistently and conscientiously serving many companies in widely diversified fields of production.

Each of these companies has found that "Engineered by Eclipse" is assurance of genuine quality in end cutting tools.

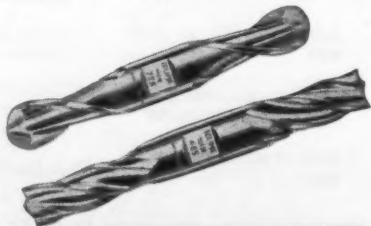


- High Speed Steel Cutters
- Carbide Tipped Cutters
- Core Drills
- Inserted Blade Cutters
- Multi-Diameters
- Back Spotfacers

**and remember . . .**

Eclipse now has a complete line of Precision End Mills. Ground from the solid, Eclipse End Mills insure longer tool life, finer finishes and lower production costs.

- Write for Counterbore Cat. No. 51 \*
- Write for End Mill Cat. No. 56 \*\*



**ECLIPSE COUNTERBORE COMPANY**

DETROIT 20, MICHIGAN

END MILL DIVISION—NORTH BRANCH, N. J.

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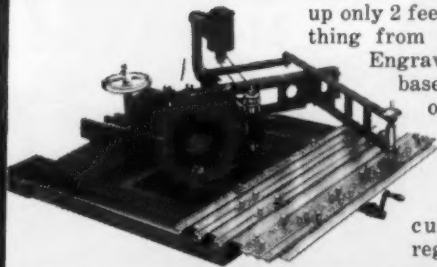
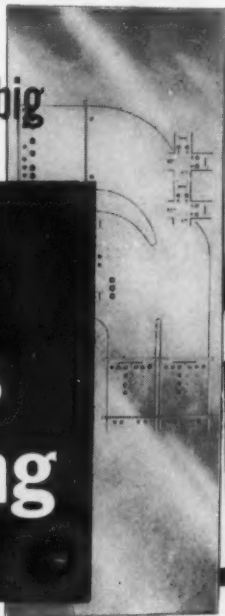
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**Now** — NO plate too small — 213B

NO panel too big

**NO  
size limits  
on engraving**



The new ENGRAVOGRAPH Model I-R takes up only 2 feet of bench space and engraves anything from tiny nameplates to giant panels.

Engraving chassis can be detached from base and placed directly on workpiece of any dimension. Smaller plates can be easily clamped in a self-centering workholder which is standard equipment. New sturdy pantograph construction; heavy duty cutter spindle; two-way depth regulator.

Send for  
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**new hermes** ENGRAVING MACHINE CORP.

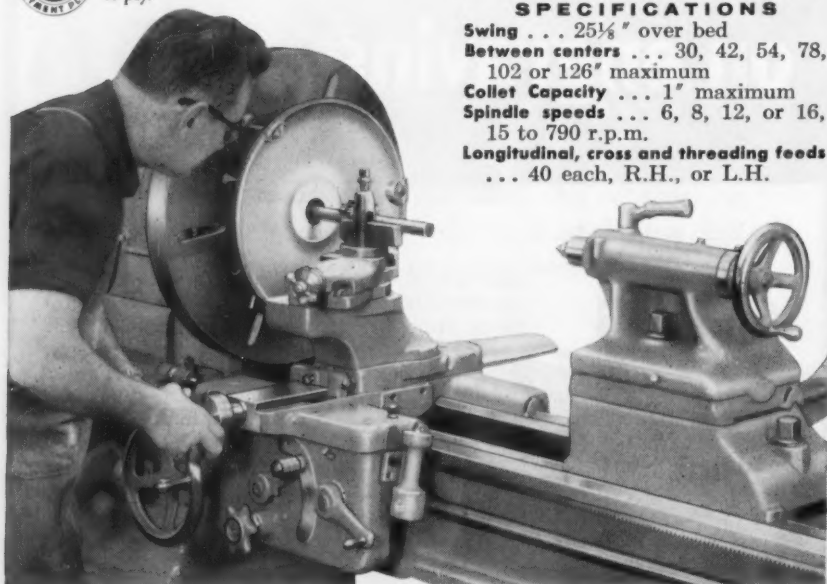
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# A REAL DOLLAR STRETCHER

**25-1/8" SWING**  
**... UP TO 126" BETWEEN**  
**CENTERS**



Up to 24  
months  
to pay.



Here's a lathe with everything that stretches equipment dollars. Its 25 1/8" swing and between centers distances up to 126" give capacity for handling large diameter, medium-weight jobs that otherwise require large, heavy and really expensive lathes. Yet, with all this capacity, the accuracy and performance that skilled machinists expect and get from South Bend Lathes have been retained. *Write for catalog.* Prices start at \$2662 (6' bed).

#### **SPECIFICATIONS**

**Swing** ... 25 1/8" over bed  
**Between centers** ... 30, 42, 54, 78,  
102 or 126" maximum  
**Collet Capacity** ... 1" maximum  
**Spindle speeds** ... 6, 8, 12, or 16,  
15 to 790 r.p.m.  
**Longitudinal, cross and threading feeds**  
... 40 each, R.H., or L.H.

## **SOUTH BEND LATHE**

Builders of lathes, milling machines, shapers, drill presses, pedestal grinders.

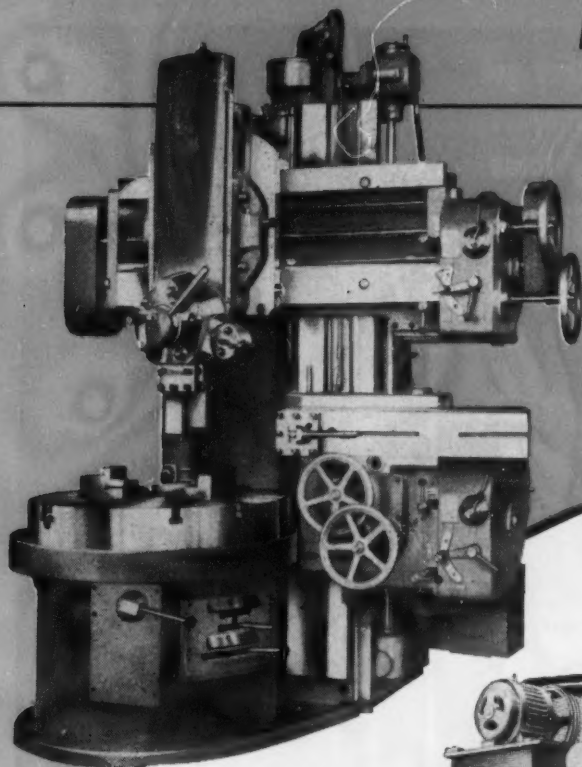
South Bend 22, Indiana

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**OUTSTANDING NEW MACHINERY...**

**AT LOWER COST!**



**NILES-IMPERIAL**

**41" - 51"**

**VERTICAL  
TURRET LATHE**

**30 H.P. MOTOR**

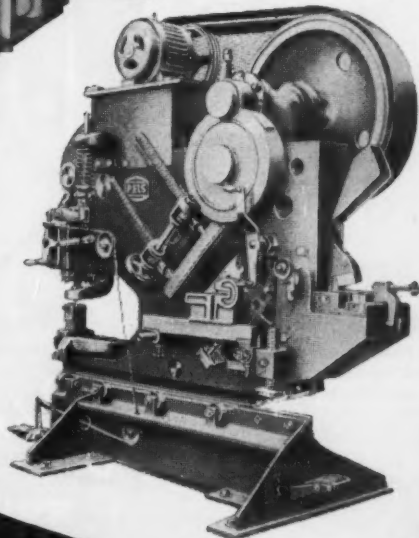
**\$24,985.**

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*A few exclusive territories  
still open to dealers.*

**PELS  
BK-16**

**COMBINED  
PUNCH, SHEARS  
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\$5975.00.**



**UNUSUAL ... 3 YEAR  
GUARANTEE**

**AARON  
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**Dept. M**

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**Walker 5-8300**

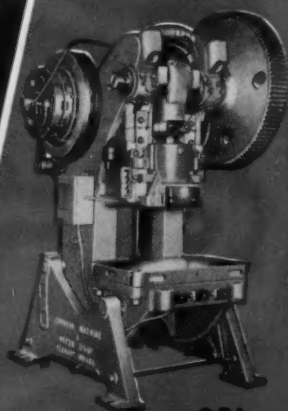
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**SEE PAGE 56**

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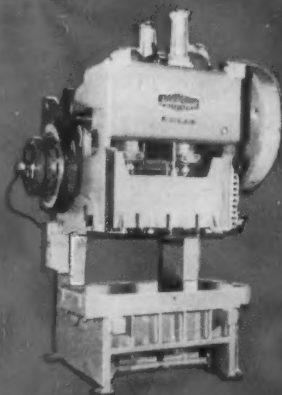
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**MORE** for their money...  
 that's why they buy these

# 3 JOHNSON PRESSES



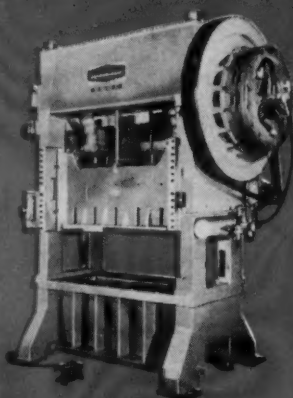
**OBI**

23 Models ranging from 16 to 150 tons capacity in regular, special wide or high speed types—pin or air clutch.



**GAP DOUBLE-CRANK**

60-100-125 and 150 ton capacities, steel fabricated, air clutch, flywheel or geared models.



**STRAIGHT SIDE DOUBLE-CRANK**

40-60-80-100-125 and 150 ton capacities. Tie rod, steel construction and air clutch.

Write for Bulletin 1956

*Johnson*


**MACHINE  
 and PRESS CORP.**

620 WEST INDIANA AVENUE • ELKHART, INDIANA

For more data circle 367 on Postpaid Card

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C



Tough 2½" diameter mandrel at Rc 44 on 1150 ton brass extrusion press. Scovill Manufacturing Co.

## **Mandrel of HALCOMB 218 retains toughness and hardness at hot work temperatures...**

This mandrel is made of Halcomb 218—a tough, air-hardening hot work steel. Halcomb 218 is suitable for tools like this which require a higher degree of toughness at moderately elevated temperatures than is obtainable with the tungsten types of hot work steels. And Halcomb 218 *retains both* its hardness and strength at these temperatures.

For example, at a hardness of Rc 44, Halcomb 218's Charpy Impact Strength is 33 ft-lbs at 500F. And it will retain this hardness after 1 hour, after 10 hours and even after 100 hours at temperatures up to 900F.

Properties like these cut tooling costs. The mandrel shown above is good for 1200 pushes, for example, and even then all it needs, usually, is repolishing before being used again.

Halcomb 218 is particularly useful for all hot work operations on which drastic coolants are used. It even resists breaking very successfully when water cooled in operation. If these sound like advantages you can use, call your local Crucible representative for more complete data. *Crucible Steel Company of America, Chamber of Commerce Bldg., 7th Ave. and Smithfield St., Pittsburgh 30, Pa.*

**CRUCIBLE**

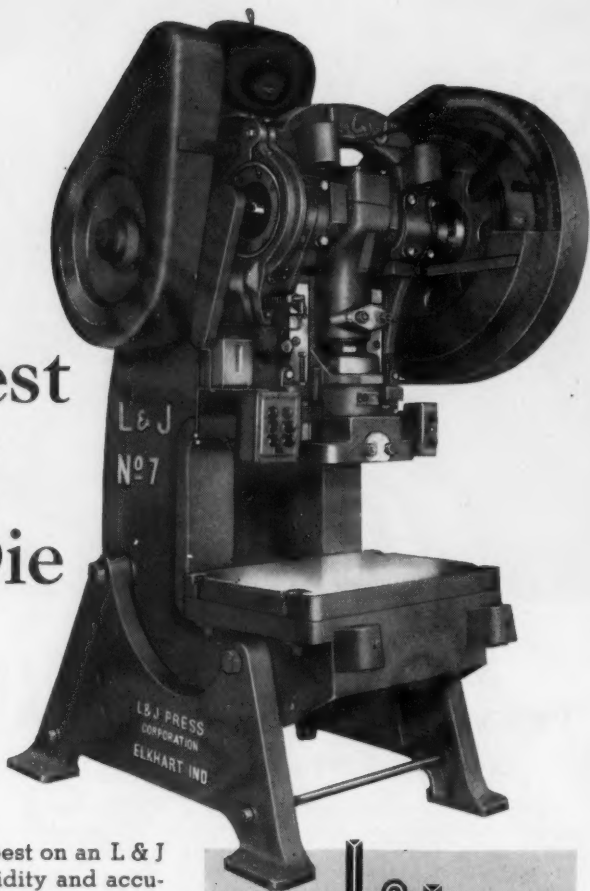
first name in special purpose steels

### **Crucible Steel Company of America**

Canadian Distributor — Railway & Power Engineering Corp., Ltd.

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# Gets the Best out of Any Die



Any die will do its best on an L & J No. 7 Press. The rigidity and accuracy of these dependable presses provide accurate die alignment that minimizes wear, and insures precision stampings. They also enable dies to produce maximum output for these presses are efficient, versatile and require but minimum maintenance. Write for complete catalog—24 O.B.I. Presses, 14 to 90 tons—20 to 100 ton Straight Side Presses.



Capacity—75 tons. Stroke—4", special max.—8". Speed—42 s.p.m. (85 s.p.m., non-g geared). Throat Depth—13½". Die Space, standard—14", special max.—23". Bolster Plate—36" x 26" x 3". Also, non-g geared. Air clutch optional.

**L & J PRESS CORPORATION**

For more data circle 369 on Postpaid Card

1624 STERLING AVE.  
ELKHART, INDIANA

# New!

## ALINA SCROLL CHUCK



**A** truly high precision chuck developed to meet exacting requirements. The method of clamping the largest possible area of the circumference permits minimum use of pressure; fragile work is never deformed or crushed. In order to maintain this advantage chucks over 4" capacity are equipped with eight jaws.

Removable jaws are available in a wide variety of styles for internal or external chucking, or they may be had in blank form suitable for your own machining.

Simple design permits quick and easy replacement of the shank, and shanks to suit special requirements may be machined at minimum cost in any shop.

Six sizes from 2" to 6" to fit all machines. Furnished with or without shanks.



WRITE FOR LITERATURE AND COMPLETE CATALOG

## ALINA CORPORATION

122 East Second St., Mineola, L. I., N. Y.

**ALINA CORPORATION, 122 East Second Street, Mineola, L. I., N. Y.**

Please send **FREE** literature on the entire line of ALINA precision measuring instruments.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

FIRM \_\_\_\_\_

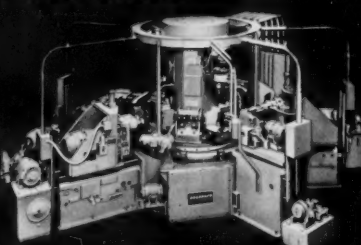
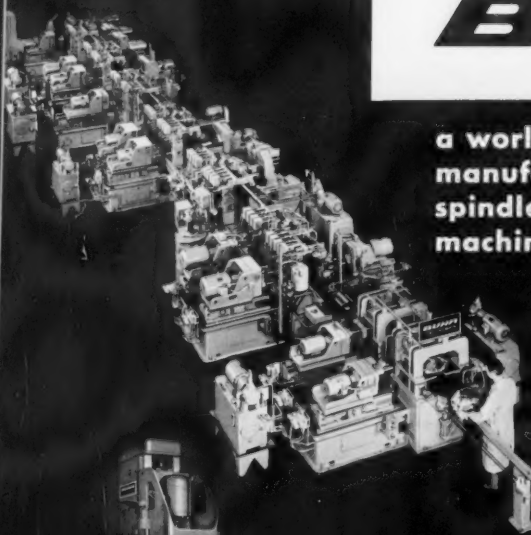
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# ***BUHR***

a world's leading  
manufacturer of multiple-  
spindle high production  
machinery like this...



the



record...

Since 1912, Buhr has grown steadily to its present position as a world leader in the manufacture of special automation machinery.

Wherever special metal-working machinery is purchased, BUHR ECONOMATICS are well-known for Quality and Performance.

***BUHR*** MACHINE TOOL CO.

ANN ARBOR, MICHIGAN

Solidly Engineered • Precision Built • for World's Leading Manufacturers

***BUHR***  
ECONOMATIC



# ACQUIRES SIDNEY

assumes full control of producing one of the nation's finest lines of precision heavy-duty metal working lathes...



**BUHR**  
plans at  
**SIDNEY..**

- 1 continue the present line of Sidney engine and precision toolroom lathes, as well as the Sidney Fluid Tracer in the conventional and universal-type.
- 2 expand the Sidney line to cover a wider range of sizes and applications.
- 3 increase manufacturing facilities to integrate production and assure better delivery.
- 4 merchandise Sidney Lathes with the same aggressiveness which has characterized the selling efforts of the Buhr organization.

*SIDNEY... a fine name in lathes... will be even FINER!*

**SIDNEY MACHINE TOOL CO.**

SIDNEY, OHIO

Wholly-Owned Subsidiary of Buhr Machine Tool Co.

**SIDNEY**



**Pick the drill that's  
right for your job!**



12" Longboy

18" Longboy

**Right you are** when you specify Ace Ground-from-the-Solid Drills! Chances are you'll find the expanded Ace line includes standard stock drills that are tailor-made for your job. Long ones, short ones. Big ones, small ones. Drills made of top quality, uniformly hardened high speed steel. Carbide tipped and solid carbide drills, too. What's more, you'll find that every Ace drill is *pointed right* for you . . . finished with highly polished flutes and stronger, keener cutting edges that resist wear and breakage, stay on the job longer. So be right, buy right . . . specify "Ace".

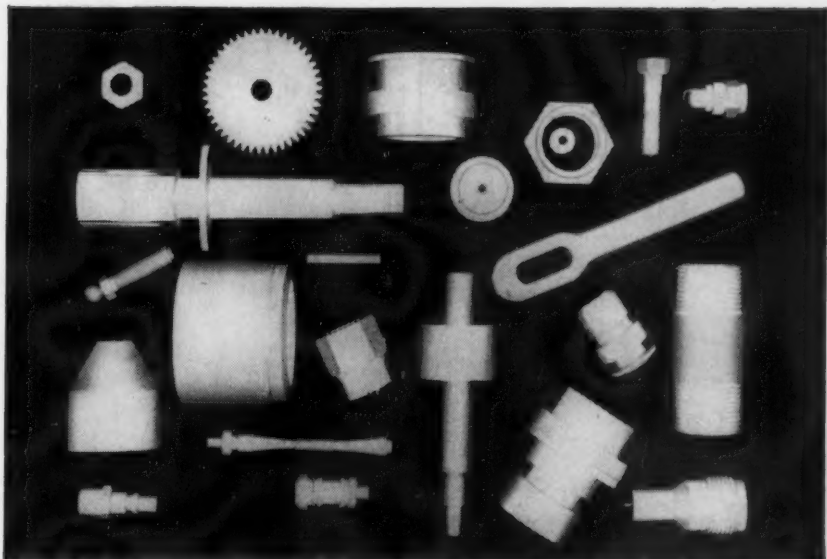
Call your local distributor  
or write direct today for the  
latest Ace Drill Catalog and  
current Net Price Schedule.



## ACE DRILL

ADRIAN, MICHIGAN

Originators of Ground-from-the-Solid High Speed Steel Drills  
For more data circle 372 on Postpaid Card



**ONE OIL, MANY METALS.** Moderately priced Sunicut 5534 gave uniformly excellent results in the machining of this wide variety of top-quality steel parts.

*Designed especially for job shops...*

## **NEW SUNICUT 5534 CAN BE USED ON A WIDE VARIETY OF STEELS**

SUNICUT® 5534 ends your search for a single cutting oil that can assure quality machining of a wide variety of ferrous metals...ranging from B1112 to 4130 and including free-machining stainless steels.

A non-emulsifying, transparent cutting oil, Sunicut 5534 can speed production of general screw machine and turret lathe work. It gives excellent finish in tapping, drilling, threading, and light stamping operations and can be used on many special jobs run at both high and low speeds.

Try moderately-priced Sunicut 5534. It can save you money by re-

ducing your cutting oil inventories and oil change time. It can boost your production and profits.

For detailed information, prices and delivery data about this new, versatile cutting oil, call your Sun representative today. Or write directly to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MM-12.



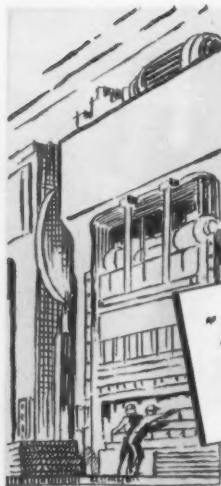
**INDUSTRIAL PRODUCTS DEPARTMENT**

**SUN OIL COMPANY Philadelphia 3, Pa.**

©SUN OIL COMPANY

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

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*"Standard" in the largest  
stamping plants*

**Lamina**

## GUIDE PINS and GUIDE PIN BUSHINGS

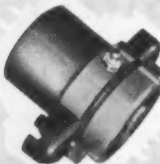
Because high production, quality control and longer die life have become all-important, most stamping plants have now standardized on Lamina guide pins and Lamina bronze-plated bushings.

All Lamina wring-fit bushings are pre-finished on the I.D. Seated on a ground shoulder square with the surface of the die shoe and secured by special retainers, they assure distortion-free, full bearing surface that results in better die alignment, less maintenance and longer die life. Lamina guide pins are special tool steel, heat treated, spray quenched, ground and burnished. The uniform, hard surface resists wear and the tough core prevents bending during installation or use. The pins are dimensionally accurate, do not "mushroom" or get out of round, and require no "running in".

There is a type and size Lamina Guide Pin and Bushing for every need. Our new catalog gives illustrations, applications, dimensions and prices of more than 800 items. Write for free copy.



**LONG SHOULDER TYPE**—Small toe clamp. Use to keep guide pin in bushing during stroke. Long wearing bronze plated on hardened steel,  $\frac{1}{4}$ " to 3" pin dia.



**HEAVY DUTY**—Large toe clamp, for large and heavy die sets requiring extra body and shoulder thickness. Bronze plated 2" to 5" pin diameter.



**NUT TYPE**—For wide range of requirements. Available in 5 sizes, 1" to 2" pin diameter, long-wearing bronze plated on hardened steel.



**LONG SHOULDER TYPE**—Large clamp. Long bearing surface contains pin during entire stroke, 2" to 5" pin diameter. Bronze on steel.



**SHORT SHOULDER TYPE**—For die space, more bearing area within die area. Bronze on steel or solid Ampco Bronze. 7 lengths, pin sizes  $\frac{1}{4}$ " to 2".



**RING CLAMP TYPE**—For heavy duty and beaded die sets. Bronze-plated steel or Ampco Bronze, 4 lengths, pin diameter  $2\frac{1}{2}$ " to 4 $\frac{1}{2}$ ".

**Lamina**

**DIES AND TOOLS, INC.**

P.O. BOX 31, ROYAL OAK, MICHIGAN


For more data circle 374 on Postpaid Card

**DAYSTROM**  
*Electric Corp.*

**—puts it on a  
RIVETT!**



Battery of Rivett 1020S Lathes in the Research and Development Division of Daystrom Electric Corporation, Poughkeepsie, N. Y.



Brass piece with off-center counterbore and through-hole completely machined on a 1020S Rivett.

Machined on a 1020S from 4140 steel after tempering at a Rockwell hardness of C20-25.

## **Productivity!**

Daystrom machines model parts with an eye to normal manufacturing methods. For this reason Daystrom highlights an important Rivett feature — productivity — in its statement:

"We have found that the Rivett 1020S Lathe is one of the most useful and all around productive machines in our model shop, and is so constructed that

it is relatively easy for an average operator to obtain the dimensions and finish necessary in our work."

"Model work requires holding concentricity to .001" T.I.R. between several diameters; turning is often held to several tenths. And, a finish of 32 micro inches and better is easily obtained!"

**RIVETT LATHE & GRINDER, INC.**

Dept. MMR-12

Brighton 35, Boston, Massachusetts

Inquire about the 1020 Toolroom Precision Lathe now. Write for 16-page catalog and name of nearest dealer.



For more data circle 375 on Postpaid Card

December, 1957

modern machine shop 71

# 50 lbs. oil pressure

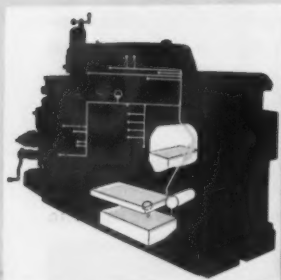
**IS NECESSARY WITH  
A CUT LIKE THIS...**



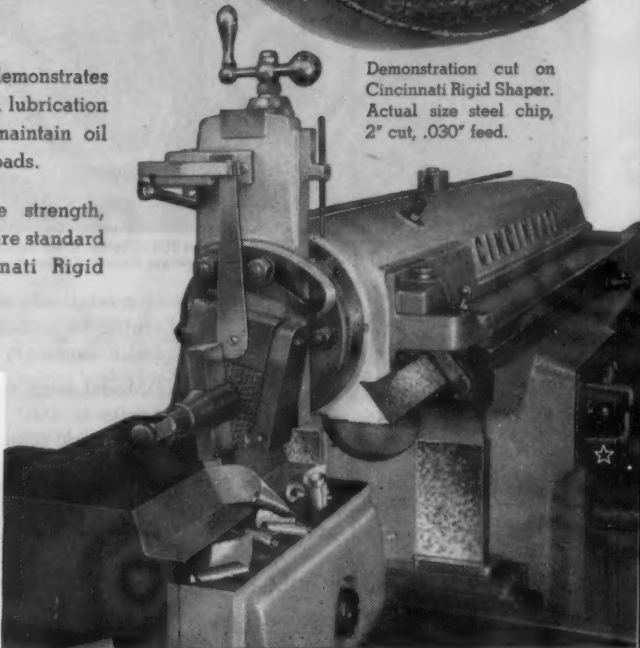
**This tremendous cut** demonstrates the ability of the 50 p. s. i. lubrication system to develop and maintain oil films under the heaviest loads.

It also demonstrates the strength, rigidity and power which are standard features on all Cincinnati Rigid Shapers.

Demonstration cut on Cincinnati Rigid Shaper. Actual size steel chip, 2" cut, .030" feed.



50 p.s.i. system includes 50 micro filter, settling basin and reservoir. Transmission runs submerged in oil.



• Write **Department G** for Bulletin  
"Cincinnati Rigid Shapers"

☆ The Electro-Magnetic Brake and Clutch with finger tip control are standard features on Cincinnati Shapers for maximum speed and ease of operation.



## THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U. S. A. SHAPERS • SHEARS • PRESS BRAKES



# CLEEREMAN

## DRILLING MACHINES

A battery of box column and round column Cleereman Drilling Machines on production work. One of many such installations producing at lower costs with higher production, less operator fatigue and no down time.



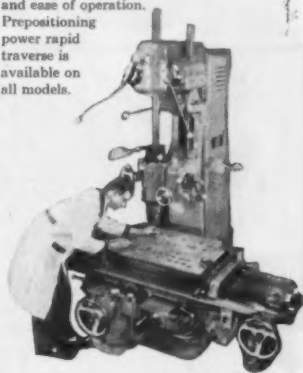
## LAYOUT DRILLING MACHINE

A modern solution to an old problem. Built for those tool room and manufacturing jobs which do not require the ultra precision of Cleereman Jig Borers. The Cleereman Layout Machine is an economical machine capable of locating within .001" per foot and drilling, boring, reaming, tapping, etc., with utmost operator ease at a fast rate of production.



## JIG BORER

Unexcelled precision for ultra-fine tolerances on highest quality gage, tool, die, jig and fixture work and on "jigless" production. Combines stamina with precision and ease of operation. Prepositioning power rapid traverse is available on all models.



**CLEEREMAN MACHINE TOOL CORP., Green Bay, Wis.**

For more data circle 377 on Postpaid Card

December, 1957

modern machine shop 73

# draws 5½" deep in one **SMOOTH OPERATION!**



Rodgers smooth acting, 100 Ton Platen Press with high speed circuit for fast approach and return of platen. Has upper knock-outs as well as pneumatic die cushion. Provides accurate clamping pressures to insure smooth, even draws.

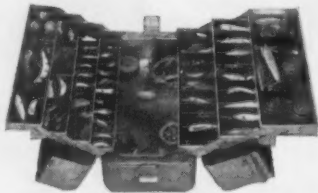
**RODGERS PLATEN PRESS forms 220 tackle box bottoms per hour with a single draw 5½" deep and retains the leather-grained embossed pattern without distortions or fractures.**

This strong, lightweight, rust-proof and moisture-proof aluminum tackle box would delight the heart of the most finicky salt or fresh water fisherman—it's the new Model 1000, in the line of famous quality tackle boxes made by the UMC Corporation of Minneapolis, Minnesota—"Land of 10,000 Lakes".

A Rodgers 100 Ton Platen Press was chosen by UMC to draw their boxes because of its extremely smooth action and efficient operation. The entire box is formed in three operations—the bottom, which is 18" long, 9" wide, is drawn 5½" in depth—the top is formed in one draw and cut apart to form the two top halves—the carrier band, of 18 gauge aluminum, is also formed in a single operation. Material used in both top and bottom is 18 gauge, leather-grained, embossed aluminum.

It requires a really smooth operating press to make these deep draws and still retain the original embossed pattern and turn out top quality production without fractures or scrap—reason enough that UMC selected a Rodgers Press to do the job.

Rodgers Platen Presses are offered in capacities ranging from 50 to 500 tons. Write for more information to suit your operations.



Light, rust and moisture-proof aluminum tackle box having 53 plastic lined compartments, by UMC.



Model 1000 UMC tackle box puts lift at bottom—where it belongs.

## Rodgers Hydraulic Inc.

7447 Walker Street • Minneapolis 26, Minnesota

For more data circle 378 on Postpaid Card



*Do You Waste Thread  
Ring Gage Life?  
Are You Using  
Full Ring Tolerance?*

**Pipe Machinery  
Hilo Set Plugs are  
The One Sure Way to Tell**

Can you be sure your thread ring gages and other adjustable instruments for inspection of male threaded parts are not being scrapped before you have used the tolerance to which you are entitled? If you're employing conventional setting plug gages that depend on the human yardstick... the individual operator's sense of feel and snug fit... you can't. Chances are you're wasting ring life!

Pipe Machinery's new more accurate Hilo Set Plugs are designed with two sections having different pitch diameters but identical lead and angles. The front end is made to the extreme low limit of prescribed ring gage pitch diameter tolerance—the back end to the high limit. There's no guesswork in sizing and setting. If the smaller end of the plug enters and the larger end is held out, the ring is the proper size for the tolerance specified. You use all the life built into your adjustable thread gages... reject them instantly and positively when the ring is out of limits.

*Write for additional information.*

PATENTED  
2789360

MINIMUM  
RING TOLERANCE

MAXIMUM  
RING TOLERANCE

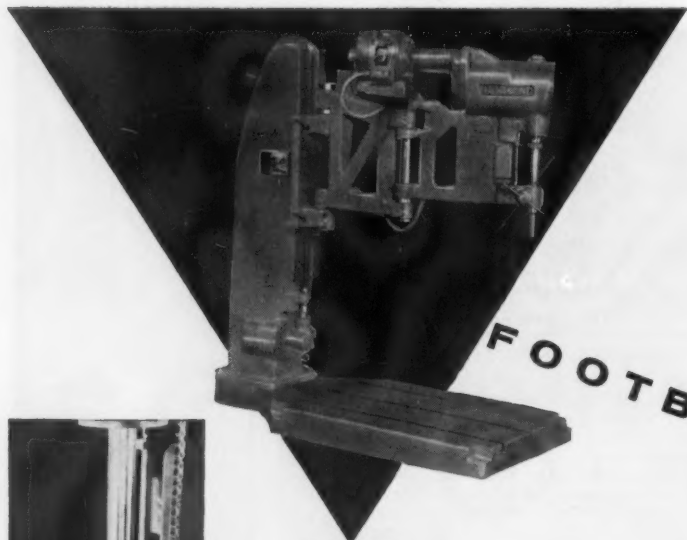
**THE  
PIPE MACHINERY COMPANY**

29100 Lakeland Blvd. • Wickliffe, Ohio

*Greater Cleveland*

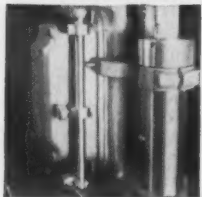
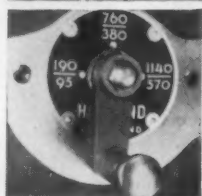
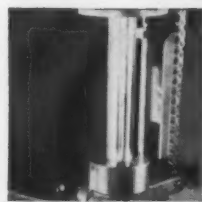


**For more data circle 379 on Postpaid Card**



**FOOTBURT**

# for **F**aster radial drilling and tapping



Hammond Radial Drilling and Tapping Machines may be spotted in the production line for drilling, tapping or reaming. With its unique Bracket Type construction the spindle can be swung quickly from hole to hole. Six Quick Speed Changes are instantly available and the Hammond Tapping Reverse is very fast and convenient to operate.

**THE FOOTE-BURT COMPANY • Cleveland 8, Ohio**  
Detroit Office: 24632 Northwestern Highway, Detroit 35, Mich.

*Write for Circular #7A*

**ENGINEERED FOR PRODUCTION**

# FOOTBURT

**MACHINE TOOLS**

For more data circle 380 on Postpaid Card



This is a typical boring set-up. Counter boring and trepanning tools give equally efficient results.

**SHELL GARIA OIL 115**  
specified for

## **LEBLOND-CARLSTEDT RAPID BORER**

*... the machine that produces deep holes 3 to 8 times faster*

The manufacturers of this new concept in deep hole boring say that the Rapid Borer was developed expressly to accommodate revolutionary new tooling which drills, bores and trepans at high speed with accuracy, and gives excellent finish. Cutting oil is forced between the boring bar and wall of stock, forming a continuous bearing. The oil is forced back through a hollow boring bar, carrying away the chips as it goes. Tool faces are kept clean and chip passage clear. Chips do not come in contact with finished bore.

To insure the success of this operation, a special cutting oil with extreme pressure and excellent cooling characteristics was required. Shell Research went to work, and out came a new addition to the Shell family of cutting oils . . . Garia® Oil 115.

If you are interested in more technical information on Garia Oil 115, write Shell Oil Company, 50 West 50th Street, New York 20, N. Y., or 100 Bush Street, San Francisco 6, California.

**SHELL GARIA OIL 115**



For more data circle 381 on Postpaid Card

December, 1957

modern machine shop 77

get this new story on...



## ROCKFORD ECONOMY LATHE

A complete description of this modern, medium-sized, economy-priced lathe designed with . . .

**SPEEDS FOR CARBIDES**

**RIGIDITY FOR HIGH PRODUCTION**

**ACCURACY AND FLEXIBILITY FOR TOOLROOM USE**

**16" AND 18" SWING**

ROCKFORD ECONOMY

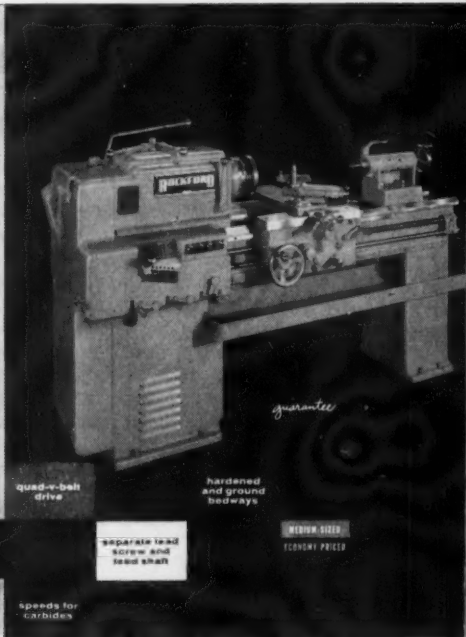
## LATHE

*a rugged, powerful design lathe in a medium-sized, economy-priced class*

The Rockford Economy Lathe is designed for 10 to 20 years of service. It is a complete machine, ready to start work with the minimum of tooling. It is built to last, with a sturdy, rigid frame and a precision-machined bed. The lathe is designed for high production work, with a wide range of speeds and feeds. It is a complete machine, ready to start work with the minimum of tooling. It is built to last, with a sturdy, rigid frame and a precision-machined bed.

The Rockford Economy Lathe has a rigid, sturdy bed with a precision-machined bed. The lathe is designed for high production work, with a wide range of speeds and feeds. It is a complete machine, ready to start work with the minimum of tooling. It is built to last, with a sturdy, rigid frame and a precision-machined bed.

Just one provision and only the service factor. The Rockford Economy Lathe is built to last, with a sturdy, rigid frame and a precision-machined bed.



quad-beat drive

hardened and ground bedways

guarantee

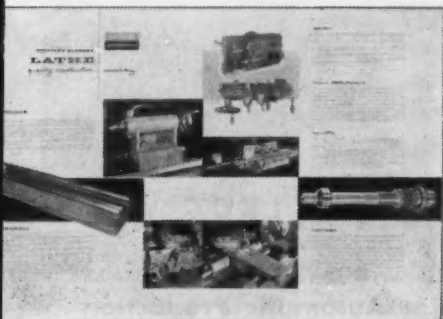
all-gears head

separate lead screw and lead shaft

MEDIUM SIZED  
ECONOMY PRICED

speeds for carbides





This completely new booklet contains photos, description and drawing of the all-gear headstock with quick-change gear box, standard construction features, and description of spindle, carriage, apron and taper attachment, together with a complete list of specifications and extra equipment.

Every methods and process engineer should have a copy for comparison of production and accuracy lathe values. This bulletin also makes it easily apparent how to specify lathes equipped to meet specific production problems through selection of size, feed and speed range, and electrical equipment. Full description is also available on tracer controlled operation with the Rockford Kopy-Kat Duplicator.

#### get a copy . ask your distributor

There's a Rockford Machine Tool Co. representative in your area who will quickly send you a personal copy of this new booklet for reference and file. If you are a methods, process or production engineer, master mechanic or production superintendent drop him a line on your company letterhead, or write direct for Bulletin No. 904.

#### ROCKFORD MACHINE TOOL CO.

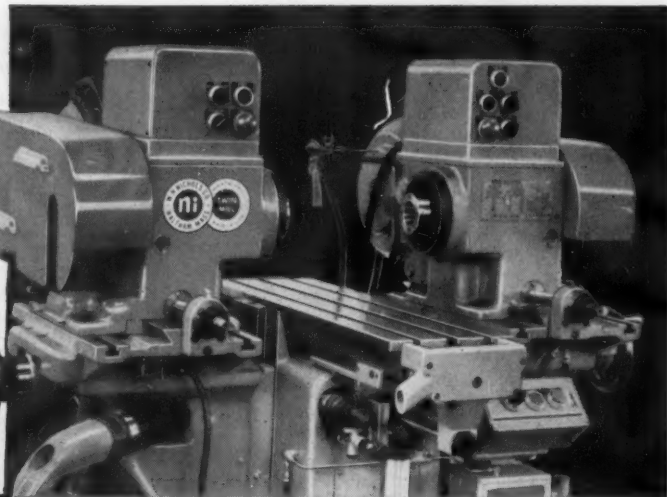
2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

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5535 Harvey Wilson Drive  
Houston 13, Texas
- Wisconsin Tool & Machine Co., Inc.  
4528 West North Ave.  
Milwaukee 13, Wis.

For more data circle 382 on Postpaid Card

Twin Mill



## NICHOLS MILLERS...

### Ideal Basic Machines for Automatic Production

**NICHOLS MILLERS** are versatile, work-devouring machine tools, unexcelled in accuracy and fine workmanship.

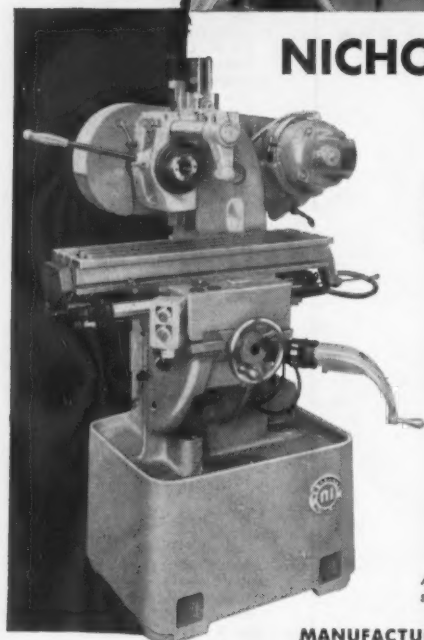
The TWIN MILL is practically TWO milling machines in ONE. Opposed Milling Heads have SIX-WAY adjustability for quick set-up and flexible approach to complex light milling operations. Push a button, and an automatic table cycle gives you TWO completed milling cuts. This unique duplex Miller is a cost-cutter without equal!

For high production precision milling where the double-barrelled approach of the TWIN MILL is not required, there are single spindle NICHOLS Semi-automatic Millers of varying work ranges. In addition to automatic table cycles, synchronized automatic down-feed of spindle head and automatic cross feeds are available.

NICHOLS MILLERS have a magnetic attraction for the Tool Engineer's ingenuity.

Write for literature and illustrations.

A NEW 16 mm. sound, color movie is available for free showing. May we reserve it for you?



Nichols BSA  
Semi-automatic



MANUFACTURED BY W. H. NICHOLS COMPANY

National Distributors

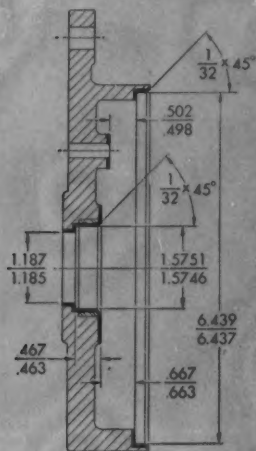
THE ROBERT E. MORRIS COMPANY

R. E. M. SALES DIVISION

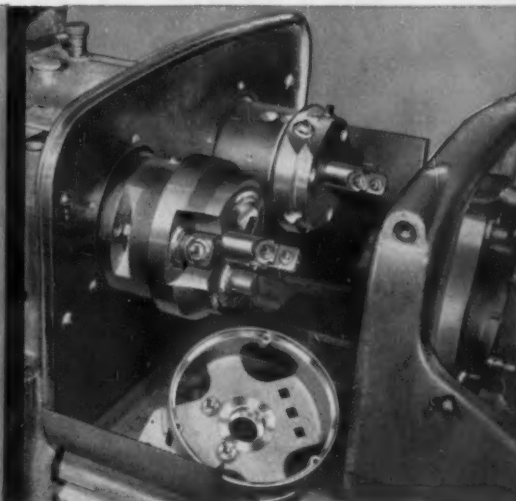
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## 9 surfaces rough and finish machined in 2 passes...



SURFACES MACHINED ARE INDICATED BY HEAVY LINES



### HOW MICROBORE CLUSTER TOOLING DOES IT ON A PRECISION BORING MACHINE!

Special Microbore Cluster Tooling makes it possible for a leading electrical equipment manufacturer to obtain a continuous flow of finished parts by rough and finish machining, simultaneously, nine surfaces on a generator end bell casting in two passes.

SET-UP TIME IS FASTER, TOO—Independent, precision adjustment of each tool point permits accurate settings in a matter of seconds. Speed and accuracy of adjustment, plus compactness of Microbore units, makes

cluster tooling practical to a degree formerly considered impossible.

Microbore is a versatile tool with unlimited application for all types of boring, turning and facing operations. Microbore Standard Boring Bars, Boring Bar Sets and Flash-Change tooling complete the perfect combination for accurate, quick change tooling.



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# DEV LIEG MICROBORE SYSTEM

DEV LIEG MICROBORE • DIVISION OF DEV LIEG MACHINE COMPANY

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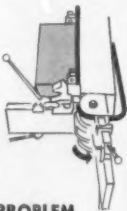
## SPEEDS BENDING ODD SHAPED PARTS

...TUBING, PIPE, EXTRUSIONS, ETC.

Pines Model 1400 with extended base, handles 10 ft. lengths of tubing over mandrel. Standard machine takes 4 x 8 ft. floor space.

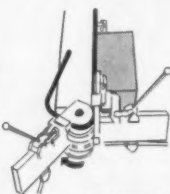
## PINES 2-IN-1 Bender

### ADVANTAGES OF PIVOTING HEAD



#### PROBLEM

Counter-clockwise rotation results in work piece striking machine base.



#### SOLUTION

Changed to clockwise operation, machine makes 120° bend without interference.

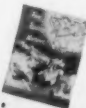
### New Model 1400 Handles Both Clockwise and Counter-Clockwise Operations . . .

For experimental, small lot, and production work, Pines Model 1400 Bender offers outstanding advantages. Designed with double tool-holder ways and a pivoting head assembly, you can handle multiple planes and odd shapes fast and efficiently. Change-overs from clockwise to counter-clockwise operation can be made in about two minutes. Designed for handling bars, rolled shapes, extrusions, and tubing up to 1 1/4" O.D., the machine features economical, quick-change tooling, smooth, hydraulic operation, and degree-of-bend turret selector. Typical production speed is 300 to 400 bends per hour.

**PINES** ENGINEERING CO., INC.  
Specialists in Tube Fabricating Machinery 643 WALNUT • AURORA, ILLINOIS

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## announcing

### Programming by numerical control for Fosmatic Jig Borers

One important objective of automation is to remove unnecessary steps and human decisions which occur between production engineering and finished product. Stated another way—to keep control of important manufacturing operations in the hands of qualified technical experts. To this end, The Fosdick Machine Tool Company and the International Business Machines Corp. have adapted numerical control to all functions of Fosmatic Jig Borers. As a result, any jig boring operation can now be completely programmed and controlled by punched cards or tapes. Once the work piece is loaded on the jig borer, the following functions can be controlled completely automatically: Table and Saddle Locations Spindle Feeds and Speeds Feed Depth Spindle Head Height Automatic Tool Changing.

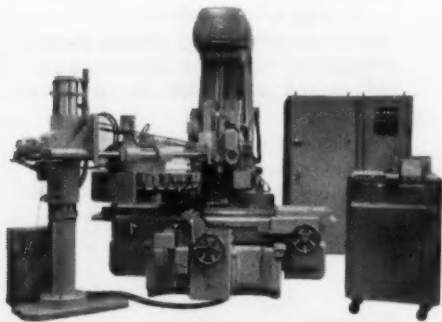
Dimensions, feeds, speeds, etc. are charted

by the Production Engineering Department, then tape or cards are punched (a simple clerical procedure).

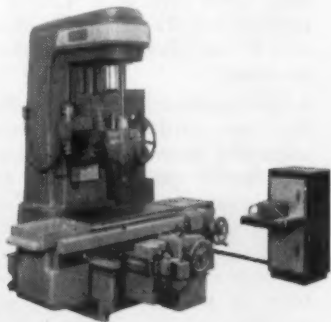
Optimum programming can be achieved by using an automatic computer which will establish the best possible sequence of operations.

Many plants, of course, are not yet ready for the total automation just described. They do, however, face problems of precision, production rate, efficiency and quality control which can be partially or wholly solved by automating one or more of the above functions. In effect, we offer exactly the degree of boring automation your plant is ready for.

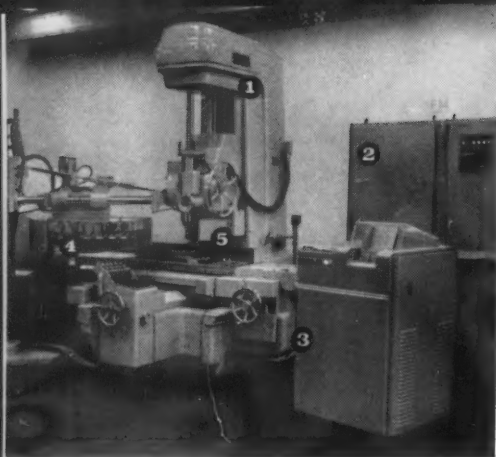
A meeting with your Fosdick representative will help you quickly determine just how these dramatic new methods can best serve your production needs.



*IBM card-controlled Fosmatic Jig Borer programs table and saddle location, spindle feeds and speeds, feed depth, head height and tools.*



*Tape-controlled Fosmatic Jig Borer built for the General Electric Company, Aircraft Gas Turbine Division, Production Engine Department.*



1. Fomatic Jig Borer
2. Control Panel
3. IBM Card Reader
4. Automatic Tool Changer
5. Automatic Hole Depth Control

## **N**umerical control on the Fomatic Jig Borer, gives

**Exactly the degree of boring automation your plant is ready for.**

By controlling numerically one or more—or all—of these functions on your Fomatic Jig Borer, you can accomplish exactly the kind of boring programming that fits best into your present operation.

By controlling table and saddle location, you will establish definite work sequence. This, of course, can be worked out by your production experts to give optimum efficiency—eliminates leaving these important decisions up to the operator. By adding the other numerically controlled functions you can assure that those functions are performed without possibility of error or lost time. These advantages apply to single piece jobs as well as to precision production runs. In both cases, the result is lower cost per piece.

A considerable savings in set-up time can be realized with this equipment when compared with other methods of doing small and medium production runs. Only a single setting on the workpiece in each direction of table travel is required. Since set-up time is very short, real savings in inventory can be made. And greater flexibility in scheduling can be achieved through use of shorter production runs.

In many situations, jigs and fixtures are eliminated, with their high cost and long lead time.

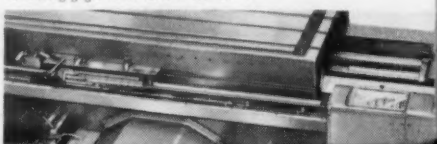
Shown and described here are the five basic jig borer functions which can be numerically controlled. They are available individually or as a group and are recommended in the order discussed.

### *Numerical Control of Table and Saddle Location.*

This basic control automatically locates the workpiece under the spindle within  $\pm .0001$  of the specified dimension. For measurements along the X and Y coordinates, a series of Class A measuring gages are lined up. There are gages in even tens of inches, gages in increments of one inch, gages in increments of tenths of inches and so on down to increments of .0001 inch. These gages are selected through motor-driven drum dials so that they are placed end to end to provide the required dimension.

Movement of the table stacks the gages and moves them to operate a switching mechanism. At the point of final position the table movement is stopped, the trav-

*Measuring gages locate table to  $\pm .0001$ ".*





erse screw is relieved by reversing it slightly and the table is clamped.

The numerical control of coordinate locations consistently reduces the time required per piece. The table automatically proceeds from one location to the next as each operation is completed without any lost time. Even on a machine equipped with numerical control of only table and saddle, the table will reach position before the operator has changed tools. This feature will also bring about improved quality of the parts being machined by eliminating operator errors. Table locations will always be accurate to  $\pm .0001$ ".

#### *Numerical Control of Spindle Feeds and Speeds.*

Additional time can be saved through automatic control of spindle feeds and speeds. This is accomplished on the Fosmatic Jig Borer through magnetic clutches in the gear trains. Speed and feeds are changed instantly from information stored on the punched cards or tape. When this feature is added to numerical control of the table and saddle, the feeds and speeds are changed as required with absolutely no loss of time. Correct feeds and speeds assure required finish and accuracy of hole diameters.

#### *Numerical Control of Spindle Feed Depth.*

This is another time saving feature that can be applied to the Fosmatic Jig Borer. The correct depth is held within .002 inch every time, eliminating operator errors.

In operation, the spindle is advanced in rapid traverse and shifts into the desired feed rate when the cutting tool is appropi-

mately  $\frac{1}{16}$ " from the surface of the work piece. The spindle then feeds down to the prescribed depth where feed and rotation are stopped and the spindle is retracted.

Spindle rapid traverse is controlled by a photoelectric unit. As the tool moves down, it passes through a beam of light; this energizes an electronic counter which allows the spindle to continue to traverse a pre-determined distance. At this point it shifts into cutting feed rate.

When the tool contacts the work, the electronic counter is re-energized by means of a vibration pickup on the fixture to control the depth of feed.

#### *Numerical Control of Spindle Head Height.*

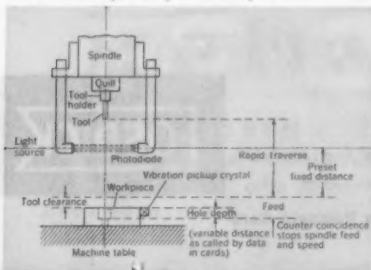
This feature insures that the head is always at the correct height so that even work pieces with hole surfaces with extreme differences in height can be run automatically. The operator's judgment is not required to determine what head positions are required to reach all holes in the part with the spindle travel available. The head will always be at the correct height.

#### *Numerical Control of the Automatic Tool Changer.*

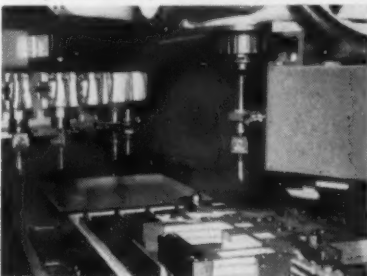
Addition of the numerically controlled tool changer to the features previously discussed makes these machines completely automatic. With a capacity of 30 or more tools in the tool rack, the Fosmatic Jig Borer is capable of completing all drilling, reaming, boring, counter-boring and tapping operations in a very wide range of jobs, all automatically.

Each of the tools used in the tool changer

*Schematic shows operation of automatic depth control.*



*Boring tool has been removed from the storage rack by automatic wrench. Spindle will feed down at slow rpm and engage thread until a pre-determined torque is reached.*



has a tapered shank with a straight external thread at the top of the taper.

Each boring tool is set for diameter in the tool room. Each tool is numbered and is inserted into the tool rack at the corresponding number.

*The sequence of events in changing tools is as follows:*

1. The spindle is retracted to the top of its travel.
2. The tool rack indexes to the specified location by the shortest route.
3. The tool rack moves radially under the spindle.
4. An automatic wrench mounted under the spindle advances and locks on a hex

section of the tool just below the taper shank.

5. The tool rack is retracted leaving the tool locked in the wrench with the shank upward.

6. The spindle feeds down at slow speed and engages the thread at the end of the tool shank.

7. When a pre-determined locking torque is reached, the wrench opens and retracts, clearing the space under the spindle.

8. The spindle feeds down and completes the programmed operation.

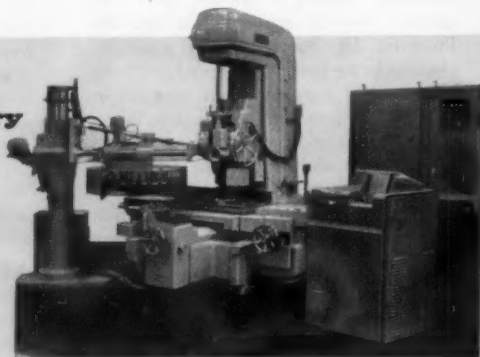
9. To remove the tool from the spindle, the spindle is retracted to the level of the wrench and the above steps, in reverse sequence, take place.

### **IBM saves on machining and inventory**

At Endicott, New York, International Business Machines Corporation uses its numerically controlled Fosmatic Jig Borer in the production of side frames for its data processing equipment.

Thirty operations are performed on each part. Total hole location error in the 16" by 18" side frames has never exceeded .0004".

In addition to the savings in the direct cost of machining, IBM says that the shorter set-up times with the card-con-



trolled Fosmatic permit inventory savings due to reductions in optimum manufacturing orders.



Numerical control by punched cards or tape is also available for the Moore-Fosdick jig grinders.

#### *May We Discuss Numerical Control With You?*

If you are producing parts with precision holes in any quantity, we'd like to talk to you about numerical control. We will analyze your requirements to see what savings can be made. Just write us with a description of your job.

*Need boring equipment? Get a proposal from Fosdick!*

THE FOSDICK MACHINE TOOL CO., CINCINNATI 23, OHIO

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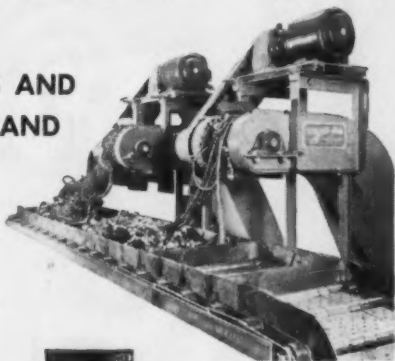
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## LOOK...NO HANDS!

That's right! The May-Fran CHIP-TOTE permits the continuous operation of machine tools by eliminating down-time for scrap removal... skilled workers stay on the job... production increases by as much as 20%! Versatile CHIP-TOTE conveyors are available in a wide range of sizes to serve practically any type or size of machine tool. Conveyor speed is adjusted to meet the scrap removal needs of the machine.

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BORINGS CONTINUOUSLY AND  
AUTOMATICALLY WITH A  
MAY-FRAN CHIP-TOTE**



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**BARBER-COLMAN'S NEW**

*Hendey* **32-speed lathe ...**

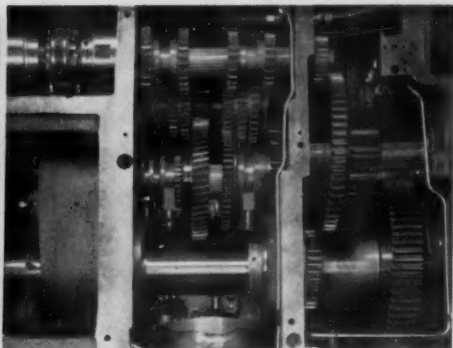
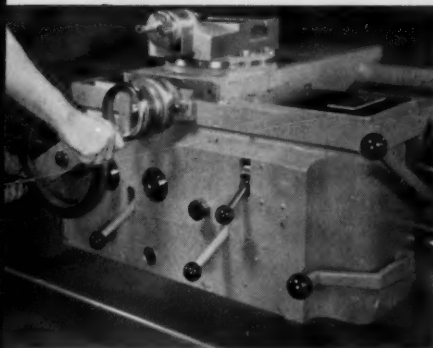
Here is a precision production lathe by Hendey designed to give you *functional simplicity* ... streamlined to cut jobs to simple, fast steps.

It's all new. There is no other lathe like it for efficient toolroom or production turning. *Functional design* provides maximum ease of operation and gives you more quality for the money.

This new Hendey lathe gives you the rigidity needed for low-cost machining with carbides and ceramic tools. The extra-heavy bed casting, made of dense wear-resistant semi-steel, is induction-hardened and ground on all way surfaces and stress-relieved to safeguard accuracy over long service life. The carriage has a full 30 in. span over the ways — wider than most lathes of the same size.

Two models now in production and available with 10, 15, 20, or 25 hp motor. No. 2013 gives you 21 $\frac{3}{8}$  in. swing over the bed ways and 13 in. over the cross slide — No. 2516 gives you 25 in. over the bed ways and 16 in. over the cross slide. Call your Hendey dealer or write the factory for literature.





#### **Timesaving control features (top left)**

Quick-change threads per inch range from 2 to 120 and feeds from .0015 in. to .091 in. per revolution. Special high-speed reversing unit, with reversing lever on apron. Independent lead screw. Precision automatic stop. Built-in thread-chasing dial. Positive overload clutch. Ball-thread-chasing stop. Automatic, filtered lubrication to half nuts.

#### **32 speeds through gearing (top right)**

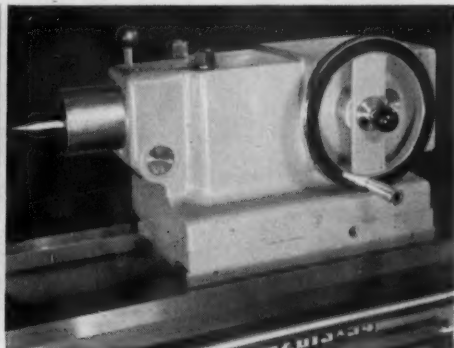
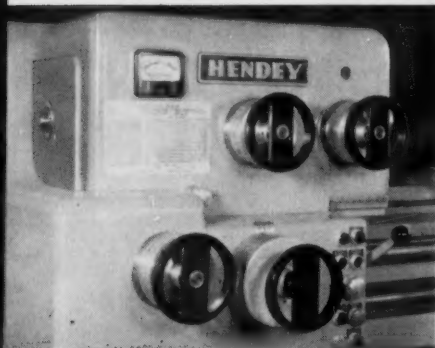
Henley's headstock and feed gear mechanism are totally enclosed. Power is through one heavy-duty multiple-disc clutch. Shaved and flame-hardened spur gears are mounted on involute splines. Filtered spray system lubricates all gears and bearings in the headstock, feed box, and change gear compartment.

#### **Quick speed changes (lower left)**

Only two dial-type handwheels, designed for quick resetting, mechanically actuate all 32 speed changes. Maximum speed up to 2000 rpm. Two handwheels on gear box control 66 quick-change thread and feed changes. Electrical pushbuttons, selector switches, and horsepower consumption meter conveniently located on gear box.

#### **Two-speed tailstock (lower right)**

Tailstock has a two-speed spindle. Hardened and ground tang-slotted spindle is  $4\frac{1}{2}$  in. in dia., has a full 10 in. extension, and is graduated in  $1/16$  in. — handwheel dial in .001 in. Rugged 40 lb tailstock, on four adjustable rollers, is positioned easily. Bearing surfaces on both sides, through whole length of tailstock base. Induction-hardened and ground ways.



*Henley* machine division  
BARBER-COLMAN COMPANY

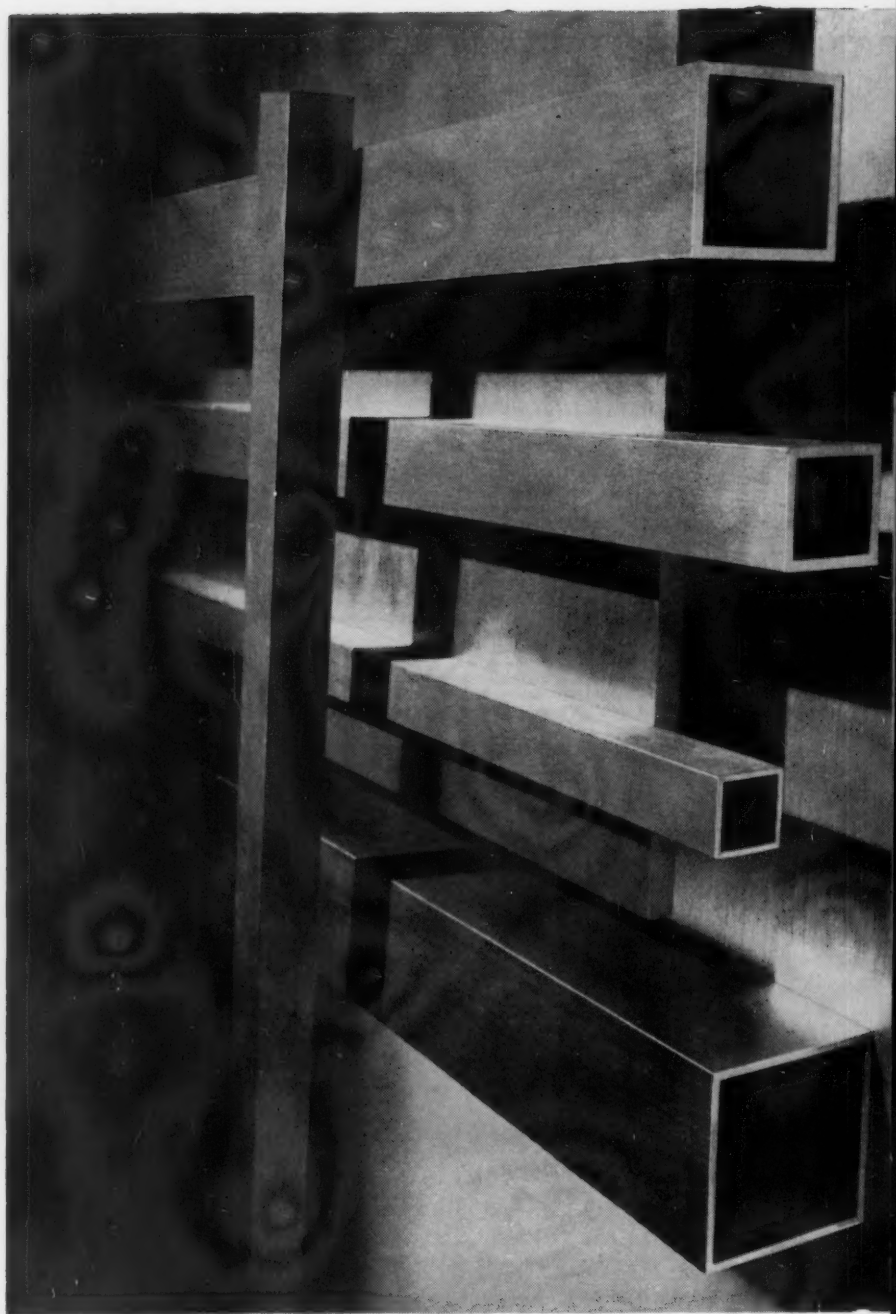


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December, 1957

modern machine shop 89







## Try this new square magnesium tubing

*Now—from your Dow magnesium distributor—square extruded tubing for easier construction of jigs, fixtures, platforms and dollies*

Square magnesium tubing combines light weight with strength, rigidity and dimensional stability. Used with magnesium tooling plate, it permits simplicity of design and construction of assembly jigs, testing fixtures and stands, movable platforms, dollies and many other tooling applications.

The square shape offers large areas of contact between members for added strength, provides flat work surfaces.

It's easier to weld, easier to cut and fit, easier to assemble—it will save you time and effort in both construction and in use.

Square extruded magnesium tubing, as well as magnesium tooling plate, is available from stock through the Dow magnesium distributors listed below. Contact the one nearest you next time you have an application for a light, strong, easy-to-fabricate tooling material. **THE DOW CHEMICAL COMPANY**, Midland, Michigan, Dept. MA 1420V-1.

**AVAILABLE FROM STOCK AT: Copper and Brass Sales, Inc., Detroit, Michigan • Fullerton Steel and Wire Co., Chicago, Ill., Hubbell Metals Inc., St. Louis, Mo. • A. R. Purdy Co., Inc., Lyndhurst, N. J. • Reliance Magnesium Co., Los Angeles, Calif.**

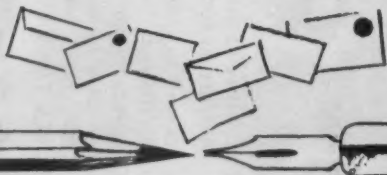
YOU CAN DEPEND ON



**DOW**

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## OVER THE EDITOR'S DESK . . .



### THE BEST OF THE SEASON TO ALL

It is with a considerable amount of pleasure that most of us can look back upon the past twelve months. We, the members of the staff of Modern Machine Shop, are grateful that most of the economic experts were wrong in their predictions of a full-blown depression for the twelve months just gone by. We found the months challenging and exciting and not at all depressing as some of the experts would have had us believe they should have been.

And because we are grateful we would take this opportunity to express our appreciation to the many friends and loyal supporters who make the publishing of this magazine possible. Our wish is that all of you may enjoy the best of health and happiness this Christmastide and prosperity throughout the coming year.

★ ★ ★

### ASTUTE OBSERVATIONS

In discussing the important issues confronting those engaged in metalworking operations of all kinds and the builders of machine tools

in particular, Jerome A. Raterman, retiring president of the National Machine Tool Builders' Association, has expressed the need to observe caution but not be alarmed over conditions presently facing the industry. This observation was made during the 56th Annual Meeting of the Association recently held at French Lick, Indiana.

Mr. Raterman pointed out that while the machine tool building industry, by and large, has been subject to great variations in volume, due chiefly to defense emergencies, the record of earnings and dividends is one of remarkable stability. As to present markets for tools, it would appear that at least four primary areas deserve consideration—national defense, export, plant expansion, and last but not least, replacement, which is the very backbone of the industry.

A look at national defense reveals that the government is now recognizing national defense as a continuing problem instead of an emergency situation, and that adds an element of stability to the industry. As to what will happen with the constant change in the demand for military hardware, whether it be for intercontinental missiles



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or the launching of a new satellite is anybody's guess.

The export of tools, which just a few short years ago represented an average of about 20 percent of the output, has dwindled to about 10 percent of production and shows no signs of not continuing to decrease. During the first six months of 1957 imports of foreign built machine tools into the U. S. showed an increase of about 60 percent over 1956. Thus far they have accounted for but a little more than 3 percent of domestic sales, but the trend in this direction is definitely upward.

As to plant expansion, a year ago incredible expansion plans were in the offing. Today they show signs of extensive revision, mostly cut-back. Mr. Raterman expressed the view that many plans merely have been postponed and that it would be most difficult to anticipate when they would be re-activated.

Particular consideration is being given to the factor of replacement of old and obsolete machines by new and better models. In this area alone, it was pointed out, there appears to be enough potential business to put machine tool sales once again on an ascending scale. To acquire this business requires the man-size sales job to persuade customers and prospects to buy new machine tools because they need them right now, today, in order to

continue to make a profit in the drastically competitive picture that now faces all American industry.

Mr. Raterman concluded his remarks by stating three reasons why he felt that builders of machine tools should be able to accomplish the sales job required of them:

First: The figures on age and obsolescence of machine tools now on the plant floors of the United States indicate an enormous potential replacement market;

Second: Above and beyond this market lies the future demand for new machine tools for plant expansion projects delayed, but not abandoned;

Third: The rate of research and product development within the machine tool industry is today so rapid that a machine that many a company think is "good enough" today will not be good enough for tomorrow.

★ ★ ★

## **MORE THAN TWO MILLION EXPIRED PATENTS**

C. W. Ooms, former Commissioner of Patents recently stated that it has been the man with an idea, the man with an invention, the man with a small business who has been able to give our country all of the advantages that measure the American free enterprise system. It is usually the small business that translates an invention into a utilizable idea.

According to Ooms, a patent is nothing more than a grant by the United States to an inventor of the exclusive right to exclude others

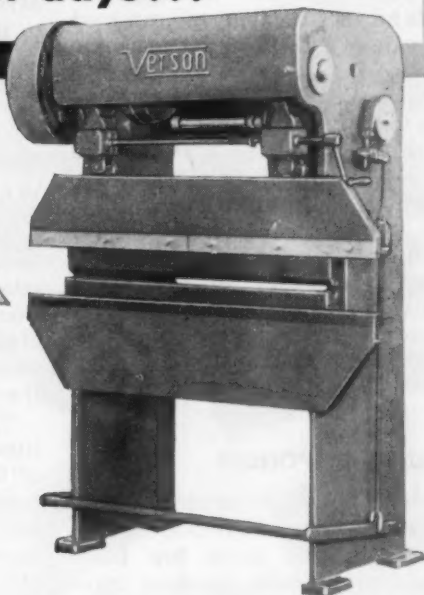
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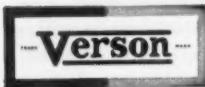


If you're trying to "get by" without a power press brake... or if you're tying up big brakes on small jobs... here's the answer to your problem — a rugged Verson Model 16-48 press brake. You can get one right "off the shelf" for only \$1600\*. You

get the famous Verson all steel construction plus proved-in-service Verson design. Capacity is 16 ga. x 48" of mild steel. Write for complete specifications and then place your order. That's all there is to it... no involved proposals... no delays.

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from using his invention for a period of 17 years. In exchange for this the inventor publishes a working description of his invention in the patent, so that when the 17 years have expired anyone can read the patent and, using its teaching, practice the invention.

What has this to do with business today? The expired patents, of which there are some 2,300,000, are the greatest library of practical applications of invention known to man. This repository of technical teaching is a vast resource of "idea" material for small businesses in particular, and it is accessible only because the patent system has made it so.

★ ★ ★

### FIGURES TO PONDER

Seven years has made a lot of difference in the increased amount of money that some top notch American business leaders must earn in order to maintain their income, much less increase their take home pay by any appreciable amount. This fact was brought to light during the recent questioning of Arthur B. Homer, Chairman of the Board, Bethlehem Steel Company by Senator Everett M. Dirksen of the Senate Anti Trust and Monopoly Subcommittee of the Kefauver Committee. Mr. Homer is said to be the third highest paid

executive in the United States. In 1950, his salary and bonus amounted to \$382,000 before taxes. After a tax bite of \$270,000, the amount of \$112,000 remained. In 1957, his salary and bonus amounted to \$669,000 before taxes. On this amount, however, the tax amounted to \$556,000, leaving Mr. Homer with \$113,000.

A rapid calculation reveals that Mr. Homer's company was required to increase his income by \$287,000 in order to provide him with an additional \$1,000 in take home pay.

★ ★ ★

### WAGING PEACE

The following excerpts from an address recently delivered by Secretary of Commerce Sinclair Weeks would seem to indicate that the National Administration is somewhat aware of the plight in which the country finds itself today.

"The voice of the Russian satellites is being used in some sections of the globe in an attempt to scare people with the threat of Communist terror. But to Americans the sound is more than a warning siren. It is the starting signal in a new contest to demonstrate again what this country really can do when challenged.

Right now, we have the world's strongest economic system, built not by slaves, but by free people who are determined to stay free.

The current threat creates an opportunity for business to play a great role. The Administration will continue to do everything possible to maintain a climate of private enterprise. The nation is counting on



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## PARKER SPINDLES

FOR ANY MACHINE—FOR ALL APPLICATIONS



Following its development in 1915 and as a result of constant improvement through the years, the Parker Spindle has become one of the most widely used spindles in this country today on many makes of machines. The

demand for speed and endurance in grinding, precision boring and milling which the Parker Spindle makes possible has made Parker-Majestic Incorporated the leading manufacturer of precision spindles.

**P A R K E R - M A J E S T I C , I N C .**

147 Joseph Campau • Detroit 7, Michigan



the contribution of business to make that dynamic system work—to provide the economic base for both national security and peacetime well being—something which Communism with all its boasting has never been able to do.

The Kremlin at times can concentrate intense effort on certain technological goals and reach them. But the price is poverty, slavery and unjust punishment for the oppressed and a leadership poisoned by truculence and hate. We have no comparable record of social and moral failure.

In contrast, our scientific and industrial advances have given America massive military strength. That progress also has helped to raise our standard of living to unprecedented levels and has showered mankind with countless peacetime blessings.

We're not going to change the American Way for the Communist Way. But we're going to use our American Way to do an even better job. And that's where business has a great responsibility.

Now is the time for dedication, vision and action in advancing the aspirations of business and the welfare of the whole country. Now is the time to show that our free system has the capacity to defend our way of life and the will to do all that is necessary to defend it. Now is the time to prove that we can wage peace and spread its benefits

among ourselves and other peace-loving peoples.

The coming months will be the acid test of government leadership and business statesmanship."

★ ★ ★

## EXECUTIVE FAILURE

When we know why men fail in business ventures, we have taken the first long step in the process of helping them to succeed. That was the thought F. J. Gaudet, director, Laboratory of Psychological Studies at Stevens Institute of Technology and a former associate, A. R. Carli, had in mind when they undertook to analyze 300 executive failures. This survey uncovered many reasons for failure, the nine most-mentioned reasons, in order of importance, were: Failure to delegate authority; lack of breadth of knowledge; inability to judge people; inability to cooperate with others; decision-making inability; lack of personnel and administrative knowledge; lack of drive; lack of responsibility; and inability to analyze and evaluate.

★ ★ ★

## AUTO FACTS AND FIGURES

All 1958 model automobiles are now in dealers' showrooms, and the industry is awaiting early sales results. The trend of automobile sales in the months immediately ahead will materially affect important segments of American industry.

Passenger car assemblies in the current year will total about 6 million units, and the industry present-

# "DO IT YOURSELF"

## Saves Hours, Cuts Costs



**HEAT TREAT SMALL PARTS, TOOLS, DIES, ETC. IN YOUR OWN SHOP WITH A VERSATILE, HIGHLY EFFICIENT TEMCO ELECTRIC FURNACE.**

Why tie up your big equipment on small heat treat jobs below its capacity, or why "farm out" heat treating of parts, tools, dies? Put a TEMCO bench-type electric furnace in your shop and see how it pays for itself over and over again—in time-savings, cost savings, and production conveniences. Shown above is Type 1700 furnace with the Control Cabinet Assembly featuring the fully-automatic AMPLI-TROL controller in this convenient mounting.

Temco Furnaces are economical to own and operate . . . easy to hook up . . . easy to use. Eighteen models with chamber sizes from 4" x 3 3/4" x 4 1/4" to 10" x 9 1/2" x 22". \$65 to \$983.25 complete with controls. Write for new TEMCO Catalog and name of nearest dealer.



**ELECTRIC FURNACES**  
Thermo Electric Manufacturing Co.  
488 Huff St., Dubuque, Iowa

For more data circle 394 on Postpaid Card  
December, 1957



**NO, NO...a thousand times "NO"**

**"NO loss of time,"**  
say the thousands of users  
of LAMINUM SHIMS...

**NO** machining!



**NO** grinding!



**NO** counting!



**NO** stacking!



**NO** miking!



**LAMINATED SHIMS OF**



<b>STAINLESS STEEL</b> with laminations of .002" or .003"	<b>LOW CARBON STEEL</b> with laminations of .002" or .003"
<b>BRASS</b> with laminations of .002" or .003"	<b>ALUMINUM</b> with laminations of .003" only

**LAMINATED SHIM COMPANY, INC.**  
Shim Headquarters since 1913  
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modern machine shop 99



ly anticipates a similar output in 1958. While this is slightly more than in 1956, it is somewhat below the 7.9 million record set in 1955.

Privately owned automobiles on the nation's highways have more than doubled, from 25 million to over 50 million, since the end of World War II. Twelve million other motor vehicles including trucks, buses and taxicabs add to the traffic flow. An expanded output of autos for a rising population, a greater percentage of car owning families and a larger proportion of multi-car families have increased the ownership of passenger cars in this country from one auto for every five people in 1946 to one for every  $3\frac{1}{4}$  persons today.

A longer average car life also is helping to swell the total number of autos on the road. The war prolonged the life of many automobiles beyond the then usual length of service. As a result, the average life of an auto scrapped in 1946 was 13 years and it had traveled 90,000 miles. This contrasts with the automobiles scrapped in 1941 which on the average were 10 years old, while those sold for scrap in 1935 were just 8 years old and had been driven less than 60,000 miles. Today, the average car is still 13 years old when sold as scrap, but it has traveled 125,000 miles.

The number of autos being junked each year is rising, but not

enough to offset increased production and extended automobile life. Except during the war and immediate postwar period when scrapage was low, about 2 million cars were sent to junk yards each year from 1928 to 1948. Although this number has doubled since 1948 to the present 4 million per year, it is still well below current annual new car sales of 6 million.

According to present estimates there will be over 60 million private passenger cars on U. S. roads and streets by 1965, and almost 70 million twelve years from now, an increase of 40 percent over 1957. The number of other types of vehicles also is expected to increase.

★ ★ ★

## CONTACT

I have read your magazine for many years and have been constantly aware of the large number of operating executives who also read your issues. It is this group of manufacturing management that I am trying to reach in the hope of locating a company into which I may purchase an active partnership.

In other words, I would like to contact a manufacturer in the metalworking industry who desires to sell a partnership to an engineer with ten years of experience in management, selling, engineering, and production. I am presently employed by an organization located in the midwest.

● *Anyone interested in the above message may address their letters to Modern Machine Shop, C/O Editor.—Ed.*

# ARMSTRONG

Quality



TOOLS

## More than meets the eye

There are extra values in ARMSTRONG TOOLS that become apparent only with use.

**TOOL SENSE**—convenience in use—the most efficient "tool approach" built into ARMSTRONG Tool Holders; the balance and "feel" of an ARMSTRONG Wrench; the rigidity of ARMSTRONG "C" Clamps; the extra toughness of ARMSTRONG Lathe Dogs and Eye Bolts; the universal adaptability of ARMSTRONG Set-up and Hold-down Tools—the evidence of "tool sense", the understanding of each tool's requirements.

**STRENGTH**—built into each individual ARMSTRONG TOOL is a safety factor of extra strength—strength beyond any need, the inherent strength of specially selected materials enhanced by proper heat treatment and hardening.

**UNIFORM QUALITY**—the uniform quality made possible by modern manufacturing methods, in a specially-built plant equipped with every needed quality control. The name ARMSTRONG with the Arm-and-Hammer Trade Mark is universally recognized as a guarantee of finest quality.

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"The Tool-Holder People"

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December, 1957

modern machine shop 101

# Looking Forward in A

**Getting the right body on the right frame without down time or man handling is the object.**

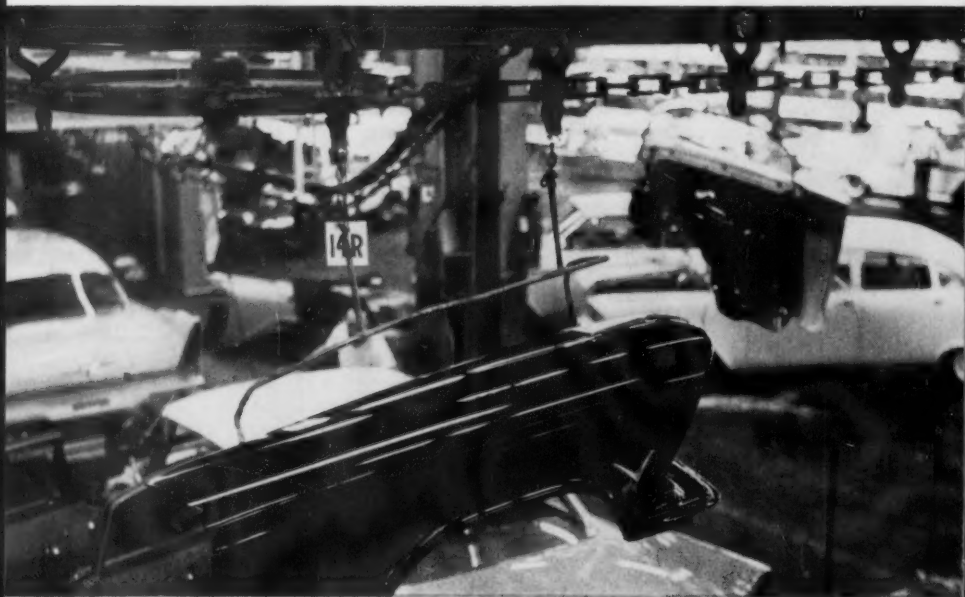
By J. G. SHEPHERD

Plant Engineer, Delaware Assembly Plant,  
Chrysler Corporation, Newark, Delaware

**Assembly lines that think for themselves** were one of the subjects discussed at the Westinghouse Materials Handling Conference held recently. The Delaware Assembly Plant of the Chrysler Corporation located at Newark, Delaware pro-

vides an interesting case study in automotive assembly operations, inasmuch as this plant embodies the industry's newest principles in materials handling.

When the plant at Newark was first conceived, central management



**Fig. 1—Carefully timed delivery of components is vital in automobile assembly. Here an overhead conveyor bearing body parts is synchronized with floor conveyor bearing body shell.**



# in Automobile Assembly



*Fig. 2—The demands of conveyor synchronism are particularly evident at the point where the body shell joins the chassis from above, as shown in this particular illustration.*

**"The facility has over 1,500,000 square feet of floor space on one floor, all under one roof."**

wanted to include the latest equipment available for the various processes involved, as well as the latest in conveyors, conveyor controls, and other material handling facilities. Since it is one of the first assembly plants to be completed as part of an expansion program it is a proving ground for future production techniques.

The facility has over 1,500,000 square feet of floor space on one floor, all under one roof. By way of comparison, this is equivalent of 32 football playing fields. There are

two and one-half miles of floor-type conveyor, on which the bodies and chassis are conveyed, and over five miles of overhead monorail conveyors. Approximately half of the present building was constructed in 1951 as a tank assembly plant. In the new addition the same construction design was followed, thus allowing ample headroom for overhead conveyors.

**The assembly of automobiles is an operation that is unique** in that it requires little machinery for changing the physical characteris-



**Fig. 3—Shown in this view are three of 15 storage conveyors used for body storage. The operator at the console uses static controls to direct body types as required.**

tics of the parts. Except for welding and painting, the operation consists of transporting parts from receiving areas to points of assembly and there assembling the parts, using principally electric and air-operated hand tools. Emphasis is on proper scheduling, efficient movement of materials and product, and efficient handling of materials within the operation itself. A good share of the emphasis is upon moving the body shell itself. It is equally important to bring to the shell—at the right place and the right time and in the right position and condition—such things as doors, deck lids, fenders, hoods, wheels, cushions, and seats (Fig. 1).

After painting and trimming, the

body is carried overhead to the point where it is dropped onto the chassis (Fig. 2). Again, this requires close coordination and scheduling to assure that the right body is placed on the right chassis. Precise synchronizing is also required.

To do this job efficiently requires that within practical limits the conveyor control system must be the most modern possible. It is the objective that at no point in the entire system, including shuttling in and out of storage banks, will it be necessary to handle bodies by hand. This requires that all conveyors within a group must be accurately synchronized so that bodies will transfer automatically from one conveyor to the conveyor ahead and



Fig. 4.—From the exit end of the 15 storage conveyors, automobile bodies are selected for automatic deposit on a main floor conveyor, as depicted in this illustration.

***"The problem of synchronizing conveyors has been successfully met in a number of ways."***

that all parts conveyors servicing these conveyors also be synchronized with the parent conveyor. This is done by the use of synchro-tie units, synchro-tie generators and magnetic amplifiers.

**The problem of synchronizing conveyors has been successfully met** in a number of ways. However, depositing automobile bodies in banks of storage conveyors and selecting them as required for deposit on conveyors for the succeeding operations is an achievement which Chrysler has never attained to the degree prevailing at the Newark plant. For example, a body shell is moved on its dolly from one conveyor to any one of 15 storage con-

veyors (Fig. 3) and counted into that particular storage line so that the conveyor is not overfilled. Then, at the opposite end of the storage conveyors, the body is selected by body style and other combinations required for proper production mix (Fig. 4), transferred to a pull-out conveyor, transported to a turn-around device, turned 90 degrees, deposited on another pull-out conveyor and, finally, deposited on a main floor conveyor (Fig. 5). To do this, it is necessary for two different sets of controls to remember what has been put on the storage lines and what has been removed, as well as to give directions for the entire series of operations. In effect,



**Fig. 5—This view shows control console for routing stored bodies to main floor conveyor.**

this problem entails a conveyor system—essentially structural equipment with large tolerances in construction dimensions—which is controlled with equipment that must be at least equivalent to the latest telephone control equipment.

Many engineers in automotive assembly remember when most materials used were moved from place to place by hand trucks, when an assembly line consisted of a series of Type A conveyors which could not make turns, and required hand trucking the product from one conveyor to another. This has evolved to a system which eliminated most of the manhandling of the product and parts that go into it.

However, there is still much room for improvement. With the advances being made in processing equipment, it is increasingly important that conveyor equipment be so designed that there will be completely smooth operation of the conveyors with no running ahead or dropping back to catch up or fall in line as is the case at present. Automatic spray equipment, for example, will not produce a satisfactory job if the part being sprayed is not always moved at the same rate past the spray equipment.

**There is, perhaps, no other industry in which continuity of operations** is so important as in the automotive assembly field. Within a matter of minutes, the stopping of one operation will shut down the entire plant. It is therefore imperative that all equipment be as reliable as possible. Limit switches, which play a very important part in these operations, must be of the most rugged construction possible. Hours of pro-

### About the Author



J. G. SHEPHERD, Plant Engineer (and Production Engineer), Delaware Assembly Plant, Chrysler Corporation, Newark, Delaware, received his education in Michigan at Flint Junior College, General Motors Institute, University of Michigan, and University of Detroit. A registered professional engineer, Mr. Shepherd has spent 22 years in automotive assembly in all phases of plant engineering and production engineering. Approximately four years ago he prepared a manual of "Engineering Fundamentals" for the use of engineers in preparing for professional engineers' examinations.

duction delays have resulted from such seemingly unimportant things as poorly designed relay points. In contrast, in most industries such failures would result in stoppages involving only a few hours or minutes of production.

To look to the future, one of the things the automobile assembly industry needs is conveyor and conveyor control equipment which has the ruggedness of the rock of Gibraltar and the precision of a watch.

# How to Reduce P

**An easy-to-apply program instituted by leading aircraft manufacturer has cut perishable tool costs by one-third.**

By GILBERT C. CLOSE  
Field Editor

**A theory prominent in many shops** is that by making it easy for an employee to obtain perishable tools from the tool crib, it will speed up his work enough to offset any costs that accrue from lack of

accurate record keeping. This theory was convincingly disapproved during a recent perishable tool conservation drive conducted at the El Segundo Division of Douglas Aircraft Company. Before the drive, perishable tool costs amounted to \$5,000,000 annually. After the drive, and despite a slight increase in production man-hours worked, perishable tool costs amounted to \$3,500,000 annually—a saving of some 30 per cent.

Before the drive, perishable tools were handled quite loosely. They were charged out to specific tool cribs in bulk lots and at that point all accounting work ceased. Employees could requisition a tool whenever they wanted it, and could return broken tools to the crib for replacement without a record of the transaction. Tool crib inventories were not kept and there was no way of knowing whether or not a crib was overstocked or understocked with specific tools.

**The perishable tool conservation drive** was conducted by the Perishable Tool Group in the Plant Engineering Division. When asked how such notable results were obtained, Fred Lorenz, head of the group, had a ready answer . . .



Dash-numbered perishable tool requisition slips are being sorted by employee named by a departmental supervisor. He can thus tell at a glance who in his department is responsible for requisitioning an unusual number of tools during the past month.



# Perishable Tool Costs

"steady downward pressure on all perishable tool costs and better record keeping played an important part. But these efforts would have been fruitless without widespread use of applied psychology."

To start the perishable tool conservation program moving, the Perishable Tool Group first held a series of meetings with administrative production personnel to discuss the situation and lay plans. These meetings resulted in complete cooperation throughout the plant. It was decided from the start that the program would have to be cumulative rather than the laying down of blanket rules and regulations.

The first important decision reached was that every employee seeking a new tool, or a replacement tool, from a tool crib would have to get the signature of his foreman or assistant foreman on a requisition slip. This rule was instigated largely because of the applied psychology involved. In the short space of a month after the rule was established, the results began to show. Employees who were prone to break or lose tools began to feel ashamed of returning time and again for a signature on a requisition slip. Secondly, when an employee did continue to return too frequently for a signature, the foreman would become suspicious and investigate. Many times a suggestion on how to use a tool or line up the work would eliminate the breakage problem. In the case of tool

losses due to outright carelessness, mild warnings usually proved to be sufficient.

A second decision which followed on the heels of the signed tool requisitions was to place a dash-number on each tool requisition to show the department in which it had originated. Thus the dash-number, plus the foreman's signature, plus the employee's name made it easy to trace each tool directly to where it was lost or broken. The



*This tool crib attendant has just noted a requisitioned tool on its inventory card and is replacing the card in the file. A quick check of the file indicates both how many tools are on hand and the frequency at which they are requisitioned for use.*

**"When unusual breakage occurred in a certain class of tools, investigations were made."**

**PLANT TOOL REQUISITION FORM 15-B (2-56)**

I HAVE RECEIVED THE FOLLOWING ARTICLES FROM THE DOUGLAS AIRCRAFT COMPANY, INC. FOR WHICH I WILL BE RESPONSIBLE. I WILL NOT REMOVE THEM FROM COMPANY PREMISES AND WILL RETURN THEM ON DEMAND OR TERMINATION OF EMPLOYMENT. IN CASE OF FAILURE TO RETURN ANY OF THEM, I AGREE TO PAY THE COMPANY THE REASONABLE VALUE THEREOF AS OF THE DATE OF FAILURE TO RETURN. I FURTHER AUTHORIZE THE COMPANY TO COLLECT SUCH PAYMENT BY DEDUCTING SAID REASONABLE VALUE FROM ANY AMOUNTS DUE ME OR WHICH MAY BECOME DUE ME FROM THE COMPANY.

QUANTITY	TOOL	
2	1/4" DRILLS, H555 JOBBERS	
TOOL RECEIVED BY		
Tom Thompson		
DEPT.	SHIFT	EMPLOYEE NO.
405	2	75852
APPROVED BY <u>Marcella Norfleet</u> SUPERVISOR		DATE <u>10-15-57</u>

Dash-number requisition slip used at Douglas' El Segundo. Division for perishable tools. Dash-number at upper right indicates tool

crib at which requisition was filled. The dash-number plus the employee signature makes it possible to quickly pinpoint lost tools.

knowledge that every missing tool could be easily pinpointed was an additional deterrent to carelessness.

**Other benefits derived** from the use of these dash-numbers on the requisition slips. At the end of each month, the requisitions could be sorted according to the dash-numbered departments and then returned to the foreman of each department for further breakdown according to employee name. This final accounting of all tool requisitions would quickly reveal any unusual conditions.

The perishable tool liaison group also made use of the dash-numbered requisition slips and their abil-

ity to pinpoint tool breakage. When unusual breakage occurred in a certain class of tools, or on a particular job, investigations were made. Quite often recommendations for a tool change, or the use of a different tool to accomplish the work, would remedy the situation.

After the system of dash-numbered requisition tool slips was installed and working, a final overall use was set for them. The Perishable Tool Group approached the Accounting Department and asked for a monthly breakdown on total perishable tool costs in each department. The figures were easily obtainable from the dash-numbered

requisition slips. The Cost Accounting Department was then approached for the number of hours of direct labor performed in each production department for each month. With these two figures available — total perishable tool costs and the number of hours worked—only simple division was required in order to calculate the perishable tool costs per hour of direct labor worked.

**These perishable tool costs** per hour of direct labor were extremely useful in charting further progress of the drive. While total departmental perishable tool costs would normally vary according to employment and production within the department, any sharp variation in perishable tool costs per hour of direct labor was indicative that something was wrong somewhere, and proper steps could be taken. To facilitate this, each departmental supervisor or foreman was provided with a monthly breakdown of perishable tool costs reduced to the "cost per hour of direct labor." Thus, he could tell at a glance the progress in his own department and act accordingly.

During the cost reduction drive, several common shop practices were uncovered which were costly, unnecessary, and easy to remedy. These same practices are probably occurring in numerous shops throughout the nation.

A typical example had to do with flashlights. In studying the various perishable tool costs to see which of them might be reduced and thus facilitate the cost reduction drive, it was noted that some 250,000

flashlight batteries were consumed each year. This seemed unusual in a well-lighted plant where every jig and fixture was provided with its own special drop cords and extension lamps. So an investigation was made. In a large percentage of the cases investigated, flashlights were being used regardless of the fact that extension lights were ready at hand.

**To remedy this situation**, all outstanding flashlights were recalled to the tool cribs. Here a distinct surprise occurred. A run-through of the employee tool crib checks indicated that many employees had from four to eight flashlights check-



Despite very convenient cold fluorescent light extension lights such as shown being used in this illustration, employees continued to use more expensive flashlight lighting until pressure was brought to bear.

**"It was noted that the company was purchasing an average of about 50,000 new clamps each month."**

ed out in their name but only one flashlight to return. None of these "lost" flashlights were charged against the loser, but despite these losses, the recall brought in so many flashlights that the Perishable Tool Group will not have to purchase flashlights for many years.

Today, when an employee wants a flashlight, he must not only sign a requisition, but must justify his use for the tool before he gets his foreman's signature.

In conjunction with the drive to reduce the unnecessary use of flashlights, consideration was given to the use of flashlight batteries. Battery testers were installed at each tool crib. Now the employee cannot approach the crib and ask for six new batteries to replace those in the flashlight he is using. The old batteries must be turned in and each of them is tested. Only batteries falling below specified voltage are replaced.

Another typical example had to do with the use of skin clamps (small clamps used to hold sheet metal skins against stringers while they are being riveted). It was noted that the Douglas Company was purchasing an average of about 50,000 new clamps each month. Cost of these clamps averaged about sixteen cents each. This seemed strange due to the fact that these clamps are not easily broken, and are not consumed in the course of production.

To study this situation, the Per-

ishable Tool Group conducted a tour of the plant for the sole purpose of noticing how the clamps were used. The cause of the loss soon became evident. The clamps were being issued to employees in bulk lots ranging upward to 200 clamps at a time. Because of this seemingly inexhaustible supply, employees seldom bothered to pick up a clamp if it was dropped on the floor. Subsequently, it became lost in the floor sweepings. Then, when the employee was finished with his work, remaining clamps were carelessly discarded into any convenient receptacle. Thousands of the unused clamps were found in boxes, drawers, tool boxes, and so on, in every department.

Because skin clamps are used in large numbers in aircraft production, it would have been impossible to restrict their availability. So the Perishable Tool Group decided to employ applied psychology in attacking the problem. Mysterious posters appeared all over the plant. These posters said simply . . . "If you saw a nickel, a dime, and a penny laying on the floor, would you stoop to pick it up?"

**After these posters had had time to register** and create mild interest, the inspirational "punch" was delivered. Other posters appeared stating that the average cost of skin clamps was equal to the dime, nickel, and penny, and was well worth picking up. The results of this humorous psychological

campaign exceeded all expectations. Retrieved clamps began pouring into the tool crib by the thousands. Fred Lorenz, head of the Perishable Tool Group, summed it up with a grin. "So many clamps poured in that, except for a few specialized types, we won't have to purchase new clamps for several years."

A final decision made to aid the perishable tool cost reduction drive was to keep a perpetual dollar value inventory of the tools on hand in each tool crib. Prior to the drive, all accounting work had ceased when the tools were issued to the crib. The new system called for an inventory card covering every tool in the crib (within practical limits). Each time a tool was issued, it was to be marked on this inventory card.

These cards became very useful in tool liaison work. Each month a tool liaison man would visit each crib and run through the inventory cards. He would note how many times each tool had been requisitioned. This would provide an indication of whether the crib was over or understocked on certain tools. Overstocking was far more prevalent than understocking simply because, without prior restriction, each tool crib attendant, not wanting to be caught short, had overestimated his requirements.

**One crib had over 400 files in stock** when the number of files requisitioned from the crib during a month indicated that 25 files would suffice. The machine shop tool cribs were chronically overstocked with costly cutters, end mills, and so on. In most cases the tool crib inven-

tories were sharply reduced. In several instances the cut in inventory was so great that the size of the tool crib itself could be somewhat reduced.

The only "strong arm" innovation in the tool cost reduction drive was the installation of a file in the plant protection office containing a folder on each employee. Today, requisitions covering unreturned tools eventually find their way into this file. The files are reviewed periodically, and when the file on any employee reveals an unusual number of unreturned tools, an investi-

FORM 22-1-6 (2-54) DOUGLAS AIRCRAFT CO., EL SEGUNDO DIVISION					
<b>DEPARTMENTAL MATERIAL REQUISITION</b>					
<b>THIS REQUISITION FOR ONE ITEM ONLY</b>					
CREDIT ACCT.	DATE	ACCT. SER. OR A.F.E. NO.	CHARGE SHOP ORDER		
	10-15-7		9045-517		
DRAWING NO.	APPROVED BY		DEPT.		
	W.H. Mallett		B 705-B		
QUANTITY	SIZE OR PART NO.				
6	1/4"				
DESCRIPTION					
DRILLS, HSSS JOBBERS					
DELIVER TO		PHONE	LOCATION		
P. HARRIS		1960	2F-66		
REMARKS					
MUST BE NEW MATERIAL FOR CLEARANCE ON JIG 70717N					
STOCKROOM NOTE ANY SUBSTITUTIONS BELOW					
QUANTITY	SIZE OR PART NO.				
DESCRIPTION					
TOTAL FILLED		S.R.	LOCATION	FILLED BY	DATE
QUANTITY	UNIT				
CUT BY	WEIGHED BY	AUDITED BY	CONVERSION FACTOR		TOTAL COST
PORTED BY		COST	UNIT		

Departmental tool crib requisition form used by tool crib to order more tools into stock. Form makes it possible to keep "dollar value inventory" of all tools in each crib.

# Perishable Tool Costs . . .

## DOUGLAS AIRCRAFT COMPANY, INC. EL SEGUNDO DIVISION ANALYSIS OF PERISHABLE TOOL EXPENSE (ACCOUNTS 9045 AND 9066) FOR THE MONTH OF AUG. 1957

	Control Base Direct Labor Hours	Total Expense Amount	Control Base Hours	Cost Per Direct Hour
LOCATION B				
<u>Factory Superintendent</u>				
A3D Assembly	A3D Assembly Depts.	16,927.30	271,922.0	.062
A4D Assembly	A4D Assembly Depts.	8,683.56	180,760.8	.048
Fabrication	Fabrication Depts.	85,180.02	364,963.3	.233
Production Control	Sub-Assembly Dept. 515	2,672.90	36,427.1	.073
Hangar Operations	Hangar Operations Dept.	1,909.47	166,688.1	.011
Sub-Total Factory Superintendent		\$115,373.25	1,020,761.3	.113
Tooling and Pre-Production	Tooling and Pre-Production Depts.	17,566.86	366,868.1	.048
Plant Engineering	Manufacturing and Tooling Depts.	6,886.54	1,464,153.8	.005
Misc. Depts.	Manufacturing and Tooling Depts.	1,397.97	1,464,153.8	.001
Total Location B	Manufacturing and Tooling Depts.	\$141,224.62	1,464,153.8	.096
Less: Hangar Operations	Hangar Operations	1,909.47	166,688.1	.011
Adjusted Total Location B		\$139,315.15	1,297,465.7	.107
LOCATION B6				
<u>Factory Superintendent</u>				
F4D Assembly	F4D Assembly Depts.	4,838.37	240,609.7	.020
AD Assembly and F4D Major Sub-Assembly	AD Assembly and F4D Major Sub-Assembly	13,394.60	226,308.0	.059
Fabrication	Fabrication Depts.	62,002.41	294,313.0	.211
Production Control	Enclosures & Plastics (6510)	6,028.27	101,778.5	.059
Sub-Total Factory Superintendent		\$86,263.65	863,009.2	.100
Tooling	Tooling Depts.	8,735.25	125,666.5	.070
Plant Engineering	Manufacturing and Tooling Depts.	2,908.87	1,123,218.1	.003
Misc. Depts.	Manufacturing and Tooling Depts.	1,693.45	1,123,218.1	.002
Total Location B6	Manufacturing and Tooling Depts.	\$99,601.22	1,123,218.1	.089
Total Location B * and B6	Manufacturing and Tooling Depts. (Location B & B6)	\$240,825.84	2,587,371.9	.093
* Including Hangar Operations				
Prepared By: Department B-108 Cost Accounting				

Monthly analysis sheet furnished each supervisor showing both total cost of tools used in his department during past month and cost per production man-hour of perishable tools used.



gation suiting the occasion is made. If an employee cannot produce the more durable tools when he terminates employment, they are charged against him, but at a properly depreciated rate. But this depreciation rate is never allowed to reach zero value. A tool is always considered to have a fair minimum value.

It will be noted from the above that the only thing outstanding or spectacular about this perishable tool cost reduction drive was the results obtained. The same measures could be employed in any shop or plant, without interfering with production and without antagonizing personnel. And in most shops, a one-third reduction in perishable tool costs is a figure that just can't be ignored.

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### Estimating Machining Costs.

By C. W. S. Parsons. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 400 pages, 6 by 9 inches. Illustrated. Price, \$8.00.

A guide to making satisfactory estimates of the costs of machine-tool operations, this book is planned to show the reader how to study the engineering drawing of a particular workpiece and decide how it can be made; to make a breakdown analysis of the necessary operations and their elemental subdivisions, considering men, materials, tooling, and machines; and to put time and money values on the various factors contributing to the completion of the work.

The cost estimator's job is analy-

zed to show the personal and technical background needed and the tools and methods with which the estimator works. Other fundamentals are covered in a discussion of the relation of cost estimating to engineering, and of such basic factors as tool life, machineability, and cutting-tool materials. After establishing this background, the book discusses in detail specific problems in connection with such tools and operations as high-speed drills, hole-producing operations, radial drilling, milling machines, turret lathes, broaching machines, eccentric turning jobs, and others.

Recent advances in the machine-tool field which the book covers are: (1) ceramic tools; (2) tungsten carbide cutting tools; (3) throwaway insert cutting tools; (4) tool life for minimum operating cost; and (5) electronic computers and programming devices.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★



"As much strippin' as you have been doing lately, you should be in burlesque!"



## **Man-Made Diamonds**

***General Electric's Metallurgical Products Department  
makes speedy progress in diamond development.***

**This might be called a progress report on man-made diamonds.** Since 1797 when the carbon crystal structure of diamonds was first discovered, sporadic efforts have been made to manufacture them. No reliable successes were reported until 1955. Since that time progress has been literally breathtaking. Just two years after the laboratory discovery, the process is in the pilot plant stage. Along the way 100,000 carats of industrial type

diamonds have been produced.

The process, involving temperatures in the 5,000 degree F. range and pressures on the order of 1.5 million pounds per square inch, yields diamonds varying in size from 60 to 600 mesh. While such sizes are too small for jewelry use and undersize for about a third of industrial uses, it is hoped that with further development larger sizes will be possible.

The Metallurgical Products De-

partment of General Electric Company, Detroit, Michigan, so far has invested \$2,500,000 in this development. It was a big gamble but it is paying off. Estimates run to an import of seven million carats of bort (crushed industrial diamonds) this year. The peak import hit ten million carats. Although the manufactured diamonds run about 40 percent higher in cost than natural ones, it is hoped that further research and development will bring the price down to a competitive level. The time requirement for production has already been reduced from several hours to a few minutes.

**Performance tests** already run, in lapping and grinding wheel use, indicate that the man-made diamonds are just as good as natural ones. With these results, and similar reports from selected outside companies that have run comparison use tests, at hand, Kenneth Beardslee, general manager of the Metallurgical Products Department of General Electric, looks forward to expansion of facilities about 1958.

Research people however, are more excited about the possibilities that the mastery of superhigh temperature and pressure techniques offer. They believe that the door is opened for a whole new approach to certain problems in magnetic materials and in the search for new materials that increasing technology are demanding. (A future article in *Modern Machine Shop* will deal with this search.) Already Borozon, a synthetic almost as hard as diamond has been developed which suggests that there may be a whole new family of materials on its way.



About \$30,000 worth of man-made industrial diamonds are shown in this illustration. These will go into the manufacture of grinding wheels and lapping compounds which will be used subsequently to shape carbide cutting tools and other similar materials.



Actual use tests conducted both by General Electric and selected other companies, where operators did not know the source of the diamonds, have demonstrated that the man-made industrial diamonds are as satisfactory in every respect as natural diamonds.

# Standardization of Parts S



Aerial view shows Timken Company's Bucyrus Bearing Plant in the foreground and Bucyrus Shipping Center in the background. Located between the two plants is a recreation park.

# ts Sparks Bearing Production

***Trend toward standardization of roller bearings in automotive applications enables Timken at Bucyrus plant to adopt automated techniques.***

By BARTLETT WEST

The combination of highly specialized machine tools and specially designed conveying equipment makes possible the highly automated roller bearing production setup at the Bucyrus, Ohio, plant of The Timken Roller Bearing Company. Eleven production lines, operating very much like a single carefully adjusted, high precision machine, are capable of turning out some thirty-three million bearing cups and some twenty-seven million bearing cones per year.

Immediately following the end of World War II, Timken Company management, engineering and research personnel began to explore the possibilities of a straight line method of producing bearings. Costs had to be lowered, speed of production increased, and quality of product improved. Quality had to be systematically standardized, so that each bearing part produced would be of equal quality and precision.

All of the screw machines and most of the other equipment used in manufacture of roller bearings had to be of special design or fitted with

special adaptations to fulfill the requirements imposed by this type of production facility. Emphasis was placed where possible on smaller machines, since the range of work performed by them was much less than their conventional counterparts. It was found that small single purpose screw machines and grinding machines could make possible great savings in plant production space. Cost of each production line is estimated to be in excess of one million dollars.

One of the first developments adopted by Timken was carbide tooling. Early in 1946 test work was started to determine what kind of a job could be done in green machining bearing cups with carbide tools. Some machining had been done with carbide tools but practically all of the product had been machined up to that time with high speed steel tooling. Carbides offered seemingly limitless possibilities for increased production, but the economics of such operations were not known.

A Timken engineering and re-

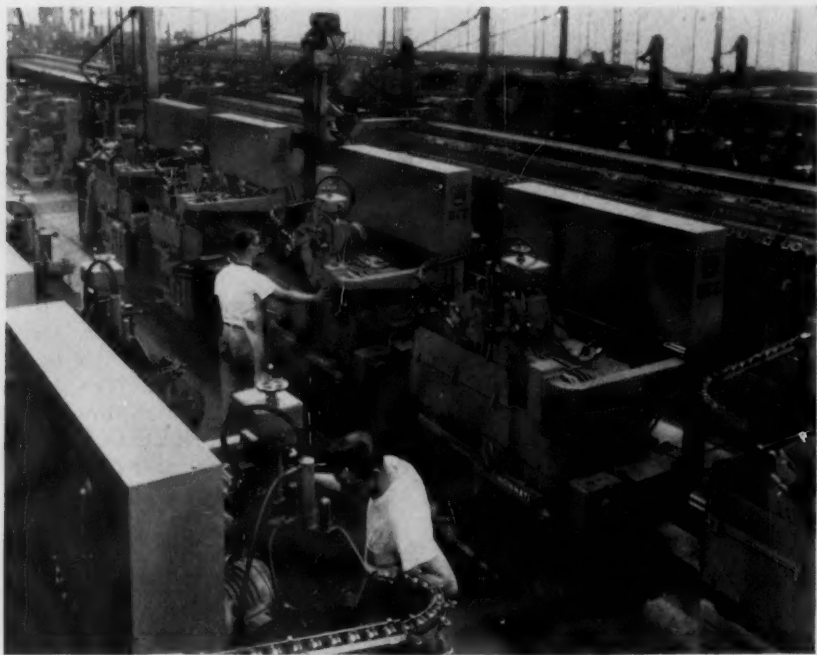
**"... new single spindle screw machines would produce eight times as many cups per hour as an old single spindle machine ..."**

search team determined that cups on single spindle screw machines could be machined at speeds four times higher and feeds two times heavier than before. This meant that new single spindle screw machines would produce eight times as many cups per hour as an old model single spindle machine and  $2\frac{1}{2}$  times as many as a four spindle automatic.

It was necessary to outline to the machine tool builders what was

wanted. Machine tool builders had to develop such a machine. The design of the carbide tooling on a new 2-inch screw machine made it possible to save one sixteenth of an inch of tubing for each cup made. On the basis of present line capacity of one million cups per month, this is a savings of one mile of tubing per month.

The Bucyrus cup and cone lines have a built-in quality control system. On critical operations bearing



**This view of Cone Finishing Department shows small number of men needed to attend machines on five cone lines. System of conveyors, chutes and elevators connects different machines.**



parts leaving the machines are held in chutes until roving inspectors check the last piece in the chute. If the part checks within tolerance the balance in the chute is released and is conveyed to the next operation. Since elapsed time between operations is relatively short, it is quite easy to make effective changes if something is wrong. For instance, at the internal honing operation, if the ground finish is too rough and parts do not clean up in honing, a change can be made at the grinding machines to correct the condition immediately.

In order to provide a steady flow of material through all operations at

predetermined average rates a product banking system was integrated into the production line. Each machine is integrated and interdependent upon machines preceeding it in the production sequence. An interlock system provides a steady flow of product at carefully predetermined rates. No machine or group of machines, therefore, gets either too much product or too little product at one time.

Because it is economically unfeasible to start up and shut down heat treating equipment, the heat treating facilities are geared to handle product volume in seven days that is processed by other pro-



Six automatic gages, visual inspection tables and cone assemblies handle production of five cone lines. Natural light was used to get this shot, showing how well lighted the plant is.

**"... banking system provides storage for product from the screw machines during periods of tool change or maintenance ..."**

ducing departments in five days.

To properly space product between heat treating and the other machining operations Timken engineers devised the product bank system. By means of product storage or banking, a steady feed of product from one operation to another is possible. Two days' storage capacity of cups and cones between green machining and heat treating and also between heat treating and grinding is provided for in bulk storage bins. Smaller bulk storage bins are located between the screw machines and stamping and chamfering operations. This banking system provides storage for product from the screw machines during periods of tool change or maintenance on these single operation machines. Bulk storage required the development of feeding and orienting devices to put product in a single line properly positioned for the next operation.

**Another vital link** in the product banking system is the distributing conveyors in the finishing departments which feed races directly into the grinding and honing machines. Bearing parts move in a continuous circle above and ahead of the machines making all parts in the reserve immediately available to all operating machines. As an opening in a machine chute occurs a bearing part ready for processing drops into place in the chute.

The interlock system, which operates by means of a series of

limit switches and photo electric cells, stops machine operation where the machine has run out of product for processing, when the machine itself is mal-functioning or when product is being processed too fast for a subsequent operation in the line.

Early in the design of the screw machines the question of using hot rolled or cold finished tubes was carefully weighed. The advantage in using hot rolled tubing is that the cold finishing operation costs about two to four dollars extra per tube depending on the size. However, the hot rolled tubes, as rolled, may vary tube to tube in outside diameter by as much as 0.060 inch in the larger sizes. Conventionally, when hot rolled tubes are chucked in the spindle, the collet tension must be adjusted. Otherwise, a minimum size tube might slip during the machining operation and a maximum tube might be chucked so tightly that damage to the collet or other machine parts could result.

Hand chucking of individual tubes did not fit in with the concept of completely automatic operation. It was known that Belleville springs (dish washers) could be designed to have nearly flat load-deflection curves over a considerable range of deflection. Three suppliers of screw machines fully cooperated in working out chucking devices incorporating properly proportioned Belleville springs so that in every size of machine almost constant

chucking pressure is obtained over the full range of hot rolled tube tolerances.

The stock racks which feed the screw machines in the green machining department are of special Timken design. Loaded by means of a lift truck or crane, the stock rack holds about an eight-hour's supply of tubing. Tubing is positioned in the screw machines from the stock rack automatically. When out of stock, the machine stops with loading ram retracted and the collet open. The attendant merely removes the butt end, and by simply pressing the handle of an air valve, the loading cradle is opened, a new piece of stock rolls into the cradle,

the cradle closes and a ram pushes the tubing into the spindle until it hits the stock stop. The tubing is automatically chucked and the machine resumes operation. This procedure is executed in seconds.

Provision has also been made for tool adjustment in the holders to make the tool assemblies interchangeable. The carbide tooling is pre-ground and pre-set in toolholders and made ready for immediate installation on all screw machines on scheduled intervals. The advantages in pre-setting all cutting tools to reduce machine down time were apparent. To accomplish this, all screw machines were designed with double adjustments. In addition to



Lines four and five of the Cone Finishing Department show the 190 Heald Centrimatics that are used to grind the bore of the cones.

Tolerances are kept to 0.0005 inch or 0.0008 inch, depending upon the quality ordered. Cycle time ranges from 14 to 25 seconds.

**"... 'pickoff' prevents the product from falling into the hole beneath the automatic spindle . . ."**

the adjustments provided in the toolholders, the slides are adjustable to obtain size on a new part being set up. Thereafter, tools are changed with no further machine adjustment. By pre-grinding and pre-setting the carbide tools, down time for the purpose of tool changes is practically eliminated.

**Improvement in the cutting off of tubing** with carbide tools had to be worked out before single spindle automatics could be economically operated. This was accomplished by using two cut-off tools working simultaneously, the first narrow tool cutting a single wide chip, the second, a wider tool, cutting two narrow chips. A free flow of the cut-off chips out of the cut-off slot is thus possible. This tool arrangement, designed by Timken engineers, prevents wedging of hot, expanded chips against the sides of the slot. Chip jamming in the slot formerly caused much serious tool damage.

Another device designed especially for the single spindle screw machines by Timken engineers was a unique hydraulic system which resulted in an increase in productivity of the single spindles by as much as 30 percent. Four slides operate off the screw machines cam shaft; the end working slide which carries boring and turning tools, forming slide which carries two radius tools, the breakdown slides carries the breakdown tool, and the cut-off slide carries the cut-off tool. All these tools work simultaneously until just

a few seconds before the cut-off tool completes the cutting cycle. Before the cut-off occurs a separate hydraulic system makes possible the quick removal of the end working tool slide and its re-engagement to the camming at the next cycle. As much as one-third of the cycle time was formerly used in returning the end working slide to the start of the new cycle.

**The system of handling coolants** and of disposing of chips from the green machining department was designed by Timken engineers, and is unique in the metal processing industry. A hole in the machine base directly beneath the spindle permits coolant and chips to fall directly into a sluiceway. Chips and coolant are separated, with the coolant recirculated into the coolant system, while the chips are automatically conveyed by means of a series of spiral and shaker conveyors to large trucks, returned to Timken's Canton Steel Mill and then remelted.

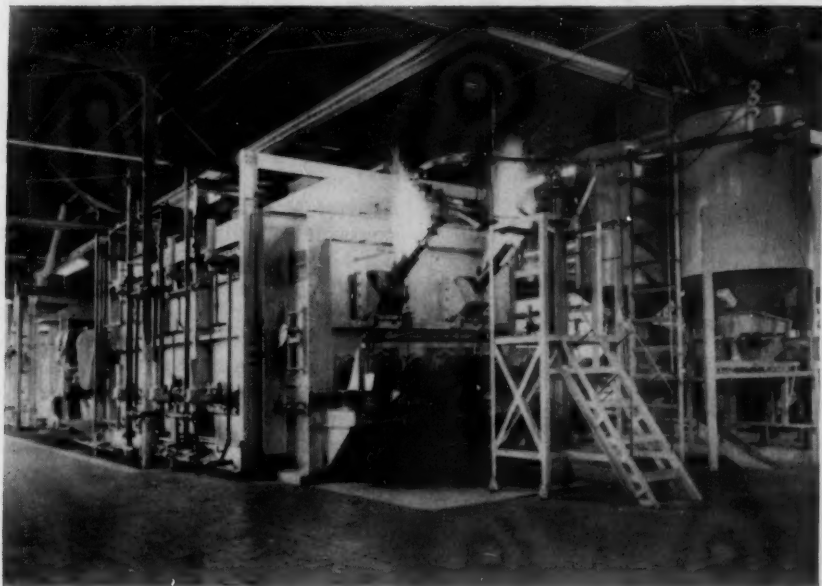
Another device designed by Timken researchers is the interesting "pickoff" which prevents the product from falling into the above-described hole beneath the automatic spindle, along with coolant and disposable chips. The pickoff pin catches the processed piece at the instant machining has been completed, preventing it from falling into the chip sluiceway below, places it on the conveyor system which sends the piece on its way to

the stamping and chamfering process. A limit switch and lever detect the presence or absence of a cup in the discharge chute at the proper time in the cycle. If no part is present for any reason, the machine automatically stops. The development of the pickoff unit was a keystone in the interlock system, since the pickoff switch insures proper release of cups from the automatics and effectively separates product from the chips.

In order to carry out the concept of through-flow, it was necessary to develop entirely new heat treating equipment and methods. This work was done in conjunction with Surface Combustion Corporation of To-

ledo, Ohio. The first heat treating operation being carburizing, a spiral retort carburizing furnace was developed using carburizing atmosphere of endothermic gas and natural gas maintained in the retort at a slightly positive pressure. The carburizing temperature is 1,700 degrees F. and the time cycle from  $5\frac{1}{2}$  to 8 hours, with a resultant carburized case from approximately 0.025 inch to 0.040 inch as required. A maximum surface carbon of one percent graduating down progressively to the core carbon of approximately .20 carbon is obtained.

**These parts pass from the furnace** into a sealed oil quench and are automatically picked up by



Long view of Cone Heat Treating Department shows straight line method used in manufacturing process of plant. Cones are process-

ed through carburizing, hardening, and tempering furnaces during heat treating. Oil quenching follows carburizing and hardening.



**"Improved methods of grinding and closer control have made it unnecessary to match cone and roll sizes."**

another spiral conveyor and carried through a washer to remove excess oil and then mechanically fed into a re-heat furnace for case refinement. There are two types of re-heat furnaces. For smaller parts that do not distort excessively, another spiral retort of smaller dimensions was designed, and for the larger parts that tend to distort more, a continuous pusher furnace was developed with an automatic plug quench. In this case, the quenching machine was of fully new design.

The re-heat furnace has endothermic gas atmosphere and operates at 1,510 degrees F. The purpose of this operation is to bring the bearing parts up to furnace temperature and

then quench them in oil. From the re-heat furnaces the parts are carried through a washer and then into a final tempering operation operating at 360 degrees Fahrenheit.

Continuous operation required that metallurgists, furnace engineers and operating people search their imagination and develop prototypes of units to accomplish this on a laboratory basis before designing the final equipment.

Improved methods of grinding and closer control have made it unnecessary to match cone and roll sizes. Grinding dimensions are held so closely that any cone can be assembled with standard size rolls, thus eliminating the need for selective assembly.

**Two types of rib grinding machines are used.** One is Timken designed and incorporates a magnetic work driver, work supporting shoes and a hollow or cupped grinding wheel. The second is a conventional Cincinnati Microcentric.

The loading mechanism on the Nos. 2 and 3 Cincinnati Centerless grinders is another noteworthy accomplishment of the Timken research team. Cups fall into the loader from a gravity chute. Each stroke of the loading mechanism places cups in a horizontal column. Pressure is applied by a system of weights pushing the column of cups against the grinding wheel. It is important that the pressure be steady and that the cups feed through squarely. If not in a tight column,





the cups may fall sideways resulting in an off-square grind. Too much pressure may cause irregular finish on the o.d. surface.

New Timken designed honing machines, using abrasive tape instead of honing stones as a honing medium, have been installed. With these machines the tape is advanced for each cup so that a new and identical abrasive surface is presented to each cup. A high degree of uniformity of finish, better clean-up of grind and considerably improved control of stand and taper are therefore obtained. Close control is maintained at all finishing operations by means of air gages capable of a uniformly high degree of accuracy.

**Cups and cones leaving the finishing departments** are gaged by Moore Automatic Gages which

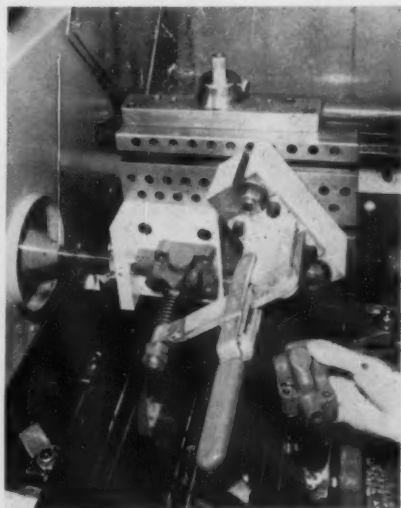
simultaneously measure all the critical dimensions. In the case of cones the gage checks the overall length, outside diameter, taper and rib length, and in the case of cups it gages the stand, taper, o.d., and length. This gage was developed by Moore Products Company in co-operation with Timken engineers.

As rapidly as economically feasible, improvements developed for the Bucyrus plant are being incorporated at all other plants. Smaller production quantities place certain limitations on the extent to which this can be done and still get the same economic advantages. Screw machines, of the same design as at Bucyrus to machine cups up to 10½ inches in diameter, have been placed in operation at the Canton, Columbus, and St. Thomas plants.

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## Efficient Cast Iron Drilling Setup

**Two operations were eliminated** when a manufacturer switched from the conventional method of drilling a cast iron valve control housing to that employing the drill illustrated herewith. The hole is 0.436 inch in diameter and 6 inches deep. The drill, made by Star Cutter Company, Farmington, Michigan, is tipped with Type CA-4 carbide, supplied by Carmet, the carbide producing facility of Allegheny Ludlum Steel Corporation. The hole is drilled in 24 seconds and is held to a 0.0005-inch tolerance with a surface finish of 20 microinches. The drill speed is 3,000 r.p.m. and the coolant pressure is 250 p.s.i.



Carbide-tipped tool setup for efficiently drilling cast iron valve control housings.

## Redstone



*A giant 63-foot Redstone missile, manufactured by Chrysler Corporation for the U. S. Army, in flight.*

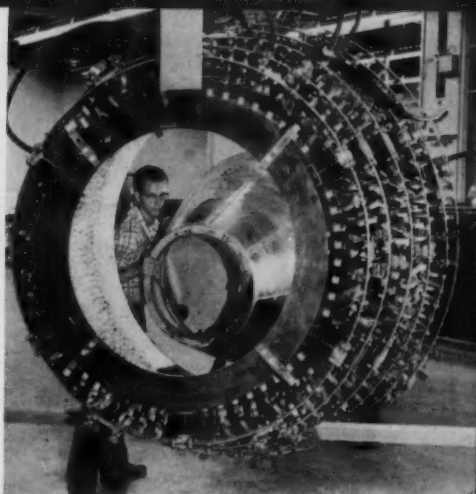
# Missile

**Amid growing congressional complaints** and reams of editorializing over the missile and satellite programs, the Army opened a peephole in the veil around the Redstone missile. The peephole was admittedly small, but it did allow a brief look at some photos of the missile in production.

The statistics that accompanied the pictures were few. The missile is composed of two sections. The fuel tanks and power plant make up into the larger section which is 34 feet long. The other section is 29 feet long and contains the warhead and control units. Massive electric cables connect the two sections. For transportation the missile when completed can be disassembled into these two sections. It is visualized that it will be carried in combat zones on flat bed trucks or airlifted on cargo planes to remote launching sites.

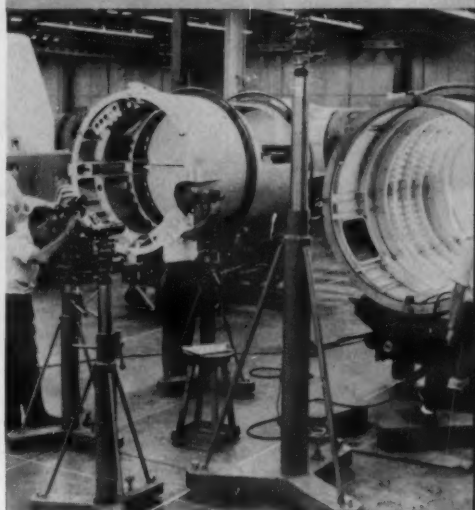
Classified as a medium range missile, the Redstone is one of the largest to be successfully flown by the Western Powers so far as is known. While not claiming it as an ultimate weapon, the Army places great faith in it. The combination of the high flight speed and self-contained guidance unit is said to make it almost invulnerable to any known countermeasure.

The Chrysler Corporation is the prime contractor and supplies the air frame. North American Aviation makes the power plant and Ford Instrument Company supplies the control system. Final assembly is done at Chrysler's Detroit plant.

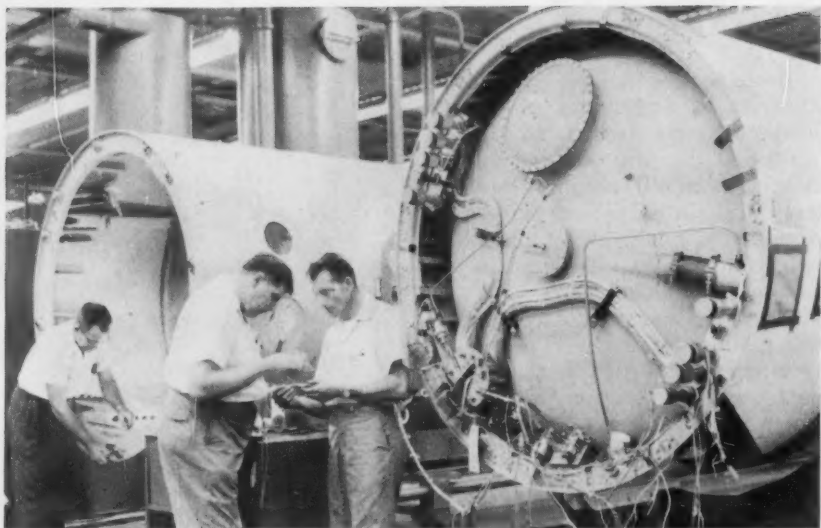


*In order to duplicate by test the severe temperature conditions encountered when a ballistic missile re-enters the atmosphere, this ingenious circular oven was devised by Chrysler engineers. Hundreds of individual quartz heating lamps are utilized in the construction of this super-toaster. The nose of a Redstone missile being readied to undergo this particular test can be seen in the background.*

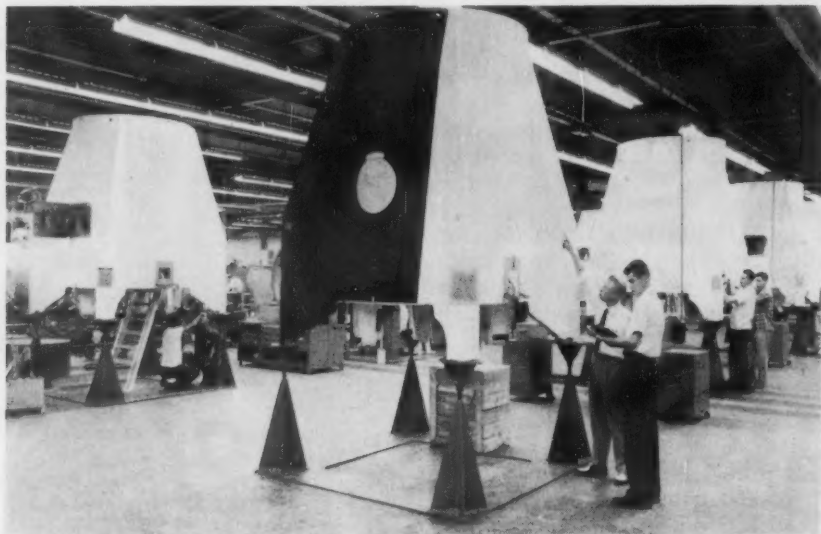
*A top section of the Redstone is being checked by technicians prior to being joined to remaining components of missile.*



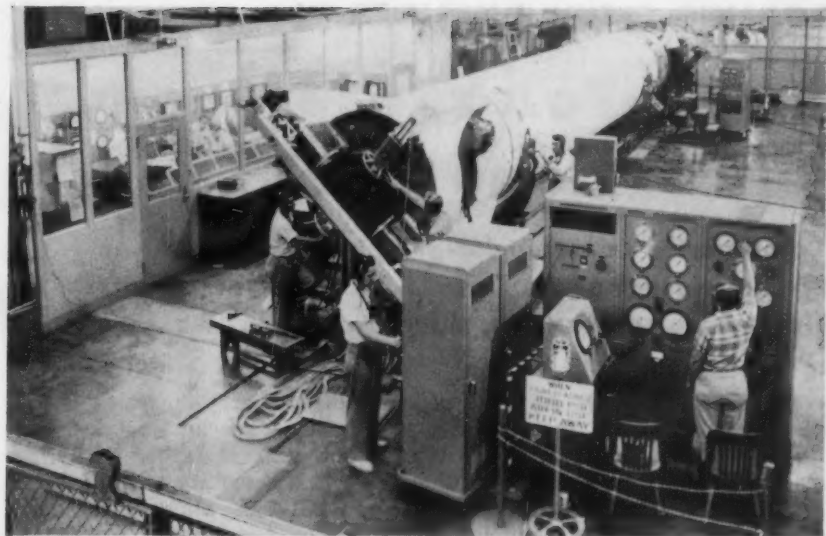
### **Redstone Missile . . .**



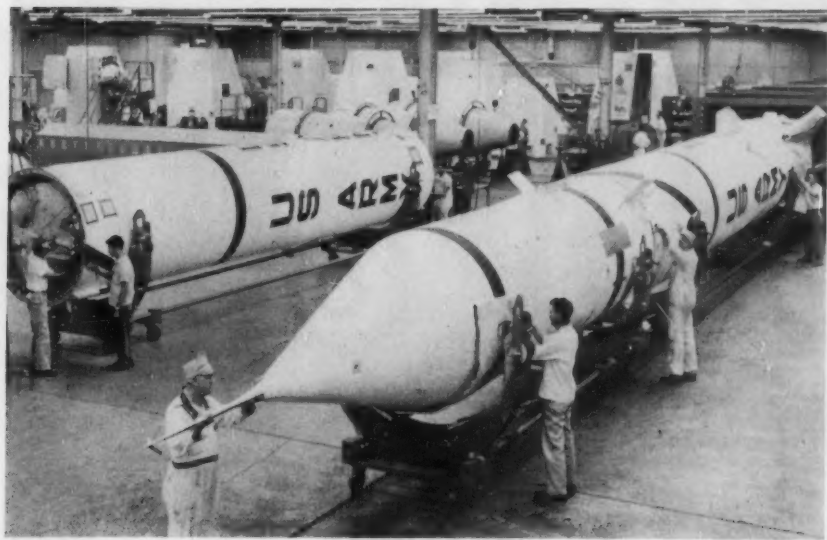
*Miles of wiring must be expertly placed and every connection securely fastened before the "bird" can blast off. Electricians prepare to join the booster section with tail and top section.*



*Technicians performing final measurement on a Redstone tail section prior to installation of the battery of electronic and mechanical devices that will provide control of huge missile.*



Here, the Redstone missile is put through its final paces before being delivered to the Army. This test simulates every flight condition possible short of actually firing the missile.



Last minute preparations are shown being performed on a completed Redstone missile. From this point the giant missile will be shipped by air to a test site on the Florida coast.

## TOOLING SETUP SIMPLIFIES

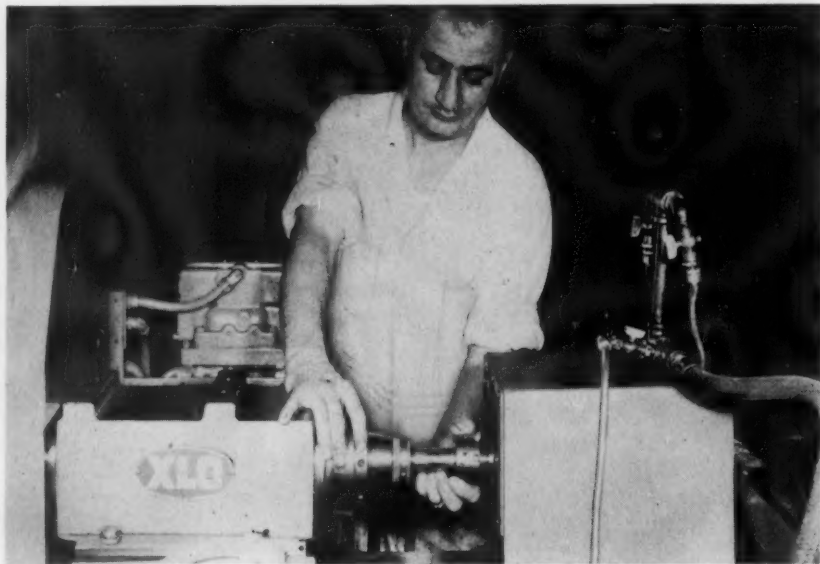
# Close-Tolerance Boring Operation

***Combination of powerful-gripping tool chuck and special cutter head enables Ford plant to accurately finish bore rear axle housing assembly.***

Despite the high degree of precision required, finish boring for bearings and oil seals in a rear axle housing assembly is a smooth-running job at the Ford Sterling Chassis Parts Division plant located just outside of Detroit. The fin-

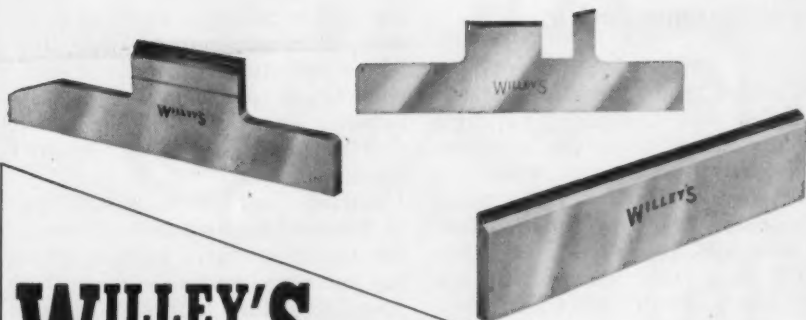
ish boring operation, which is performed on a special Ex-Cell-O boring machine, is rather tricky because it is necessary to hold size to plus 0.001 inch, minus 0.000 inch.

The combination of a "Better-Hold" chuck, together with a spe-



*Operator replaces toolholder in chuck in finish boring operation at Ford Sterling plant.*





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## Close-Tolerance Boring . . .

cial cutter head, provided by Scully-Jones and Company, Chicago, eliminated many of the problems that were encountered when the plant first went into operation about a year ago. The part being machined is S.A.E. 1010 steel with 0.001-0.013 inch stock removal by the first tool and 0.012-0.014 inch stock removal by the second tool.

Because the basic design of the chuck eliminates all clearance and play evenly along the chucking surface and creates a powerful shrink fit on the shank or holder, the tool is held in position with a high degree of accuracy and eliminates any tendency to vibrate or be off-center. With this tool setup, about 300 pieces per tool change are being realized, despite the high-quality standards.

Changing the tool is extremely simple, with a spare toolholder be-

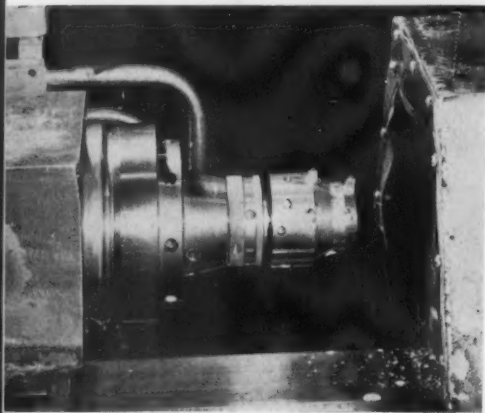
ing used to minimize machine down time. Because there is little time lost in tool change, there is no tendency to try to stretch out the time between changes, with the result that off-limits work is virtually eliminated.

Carbide tool tip spares are kept at the machine and are replaced in the toolholder body while the boring machine continues to operate using the other holder. A special, yet simple, gage provided by Scully-Jones is used to preset the sharpened tool tips into the holder body. Thus, when the change to a new toolholder is made, there is no need for making any further adjustments in the machine. The dull tool tips are gathered up and taken to the toolroom at periodic intervals for the purpose of resharpening and then returned to the machine for use as required.

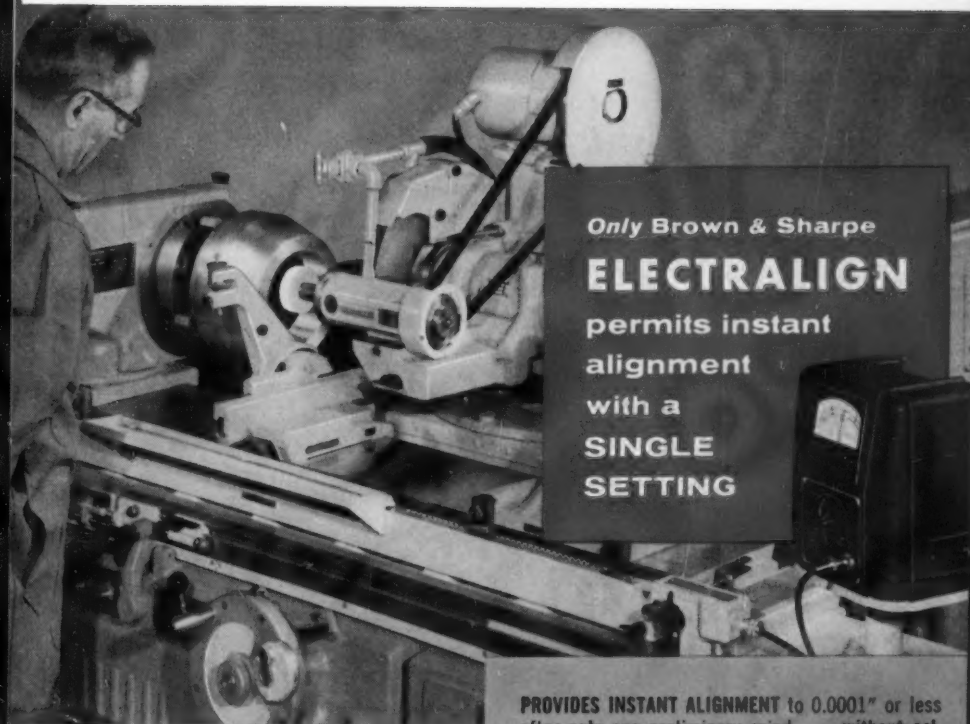
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## Band Machining Film

"Tooling the Band Saw for Production" is the title of a 16 mm. sound color film released by The DoAll Co., Des Plaines, Ill., which describes the versatility of band saws in the accurate removal of metal. The film, which has a running time of 10 minutes, shows how these cost-cutting machines provide a completely new concept to machining operations requiring shaping, slotting, splitting or facing. It depicts slotting of hydraulic pump rotors with the aid of a simple indexing fixture for moderate production and more elaborate type fixturing for automatic operation.



Close-up of chuck and boring tool in special boring machine at Ford Sterling plant.



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**LENOX**

THE TOOLS IN THE PLAID BOX

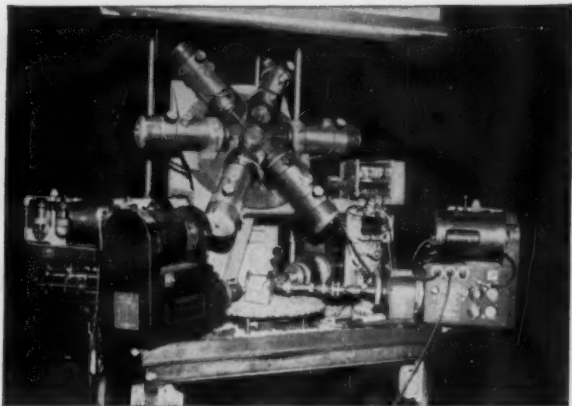
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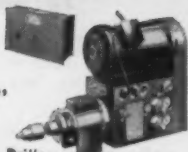
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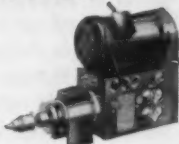
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# SUPERVISION IN TIME OF STRESS



***"In time of great stress, we can depend upon industrial foremen to do their jobs with little fuss."***

By ALFRED M. COOPER  
Contributing Editor

**As a rule, the American worker is a level-headed individual;** like any of us he may have periods when he is definitely unhappy with the way things are going — in his plant, in his country, or even in the world he lives in. But unless someone, for reasons of his own, works hard to upset him, he reacts quite normally, even when he is under considerable pressure.

Anyone who attempts to prognosticate what will happen to this country, socially or economically, within the next five or ten years, either is making a wild guess or has some particular axe to grind. This goes as well for those who professionally view with alarm as for those who always view the future through rose-colored lenses. Perhaps there are only two predictions that will stand up in the light of what actually occurs. *One is that future events are going to happen with*

*greatly stepped-up speed; the other is that this same American workman will largely determine the course events take.*

The first prediction is logical, in view of the speed with which everything occurs nowadays. Both the alarmist and the optimist foresee great changes in world affairs, not a century or so hence, but within two or three years—five at the most.

As to the American workman, he has been through quite a bit since 1940, and even before, and when you talk with some thousands of him (if you have the confidence of these people) you get the feeling that he knows more about what is going on (and what the future has in store for all of us) than most of the professional forecasters — columnists, commentators, and such. *Part of this may be due to his down-to-earth, realistic, and perhaps somewhat cynical viewpoint*



on world affairs; part of it may be due to his certain knowledge that he, and no politician or soothsayer, will actually determine the course of the future of the world.

This has been brought home to me on countless occasions. I have heard and read portentous statements made by those we usually consider the "leaders" of our modern world. These may be military men, union officials, or statesmen of highest rank. In any event, they (or perhaps their public relations officers) seldom appear at a loss for a plan or program, a panacea for the world's ills, or a resounding pronouncement of impending disaster. But when you talk to the American workman, you may find he is thinking of something altogether different.

**Sometimes it develops that this artisan has failed** utterly even to read or listen to the experts in their predictions of doom or



"Part of this may be due to this down-to-earth, realistic and perhaps somewhat cynical viewpoint on world affairs . . ."

golden promise. This must be terribly discouraging. He simply has been too busy turning out a good day's work; or he is engaged in his favorite form of after-hour recreation, and failed to read or listen to these pronouncements. This occurs even when news releases are carefully planned to reach the greatest number of people.

This situation must be disheartening to those who plan to remake this world we live in, but cannot even get started until the American worker is ready to cooperate. It makes the work of the poll-taker really difficult; even a writer may find that conclusions he has reached after careful, conscientious study, when published, simply do not have the world-shaking effect he had anticipated. Either the workmen never quite get around to reading what he has written, or they skim through the book, column, or article and then concen-



"... future events are going to happen with greatly stepped-up speed; American workman will determine the course events take."

**"Today millions of American workmen are hoping their unions will be cleaned up . . ."**

*trate on the three forms of publicity that really interest them — something new about their jobs, sporting news or the comic section.*

But don't think for a moment that these artisans are not *thinking*. I have sat with line crews in the Siskiyou Mountains during their lunch hour and with machinists in plants from coast to coast, and with these people I have discussed the future of the world. Anyone who has had this experience cannot help but be amazed at the grasp they have of world affairs. Not only this; these men fear nothing or no man, refuse to be stampeded, and arrive at their own conclusions.

**Having led foremanship conferences** with more than 10,000 supervisors in all types of plants, I

had learned how to get these men to talk. (Usually I led these supervisory conferences as a "consultant" from without the plant and was paid exactly \$100 for leading each conference. The meetings were a failure if I did not get close to 100 per cent participation. So it was my business not only to get these people to talk, but to get them to "level" with me.)

Today millions of American workmen are hoping their unions will be cleaned up; but if politicians, for reasons of their own, take action to prevent this, they will not be at all disturbed. They have a job to do. Union leadership and politics are the responsibility of others. Likewise, any sharp observer appreciates that American workmen us-



"... they skim through the article and then concentrate on something new about their jobs, sporting news or the comic section."



"... the worker often splits his vote so that there is friction. Thereafter, he smiles as he hears the screams of protest."

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**"Deep down, the American worker loves America—  
which is more than many politicians can truthfully claim."**

ually vote *against* some candidate rather than *for* one, unless the election happens to be a local one. Summing up, these workers are fairly hardboiled, cynical fellows themselves. They are honest, hard-working men and they do not look for politicians who are knights in shining armor. Yet they, and not the so-called political leaders, actually run this country.

If you doubt this, study carefully the results of any national election. Suppose that just once a majority of these American workers voted for socialism, totalitarianism, or communism — whatever name you wish to give this thing that has destroyed other countries. That day democracy *must* cease to exist in America. And don't fool yourself; these workers know it. The politi-

cians may believe they call the shots. The workers *know* they call the shots. It cannot, must not be otherwise in any country that calls itself a democracy.

**Being both realistic and hard-boiled**, the worker often splits his vote so that there is friction, and often an amazed futility, at the top. If you doubt this, ask any politician. This is the worker's method of insuring that no clique or ism is going to gang up on him and run his life. *Thereafter, he smiles as he hears the screams of protest.* Recently, for example, an experienced politician in my state Capitol stated to me that the existing situation there reminded him of a group of blindfolded men attacking a swarm of bees with baseball bats.

Deep down, the American worker loves America — which is more than many politicians can truthfully claim. Only those who have worked, slept, and eaten alongside these people for a lifetime truly understand them. They trust each other and most of their immediate supervisors, but almost no one else.

This, then, is where the foreman comes in. He is the boss man and works in close liaison with *his* superiors, but only so long as his subordinates are satisfied with him. Every experienced foreman knows this, and he knows further that you never get any place with these workmen by truckling to them. They want a boss they can trust; one that will make things hot for



"... experienced foremen are extremely perceptive; they can readily size up any new boss in a period of exactly one week."



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**"The foreman is no fool or he could not be boss man for 20 to 200 workers."**

any shirker, and one who will fight to the last ditch for their interests in the front office.

They do *not* want a theorist or a man whose background is widely different from their own to serve as their direct supervisor. What the top brass do affects them, of course, and they are fully aware of this, but they are far more interested in what their foreman does from day to day. *And they are extremely perceptive; they can readily size up any new boss in a period of exactly one week.*

**These workmen know there are a lot of things going on up at the top of their organization of which they have little knowledge. They are perfectly willing this should be so—providing it does not affect their working conditions or**

YOU'LL FOLLOW MY SUGGESTION  
— OR I'LL "GET YOUR JOB."  
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"In such instance, he may be told flatly that this particular individual is going to 'get his job' unless he does thus and so."

pay. In many instances they do not give even a thought to the top brass. I had this brought forcibly home to me in a plant employing 45,000 people when I asked a workman what he thought of his foreman. Because he knew I was not a "stoolie" he told me exactly what his opinion was. I then asked him what he thought of the plant superintendent. He looked at me in surprise, and in all honesty replied, "You mean there's somebody higher up than my foreman? If there is, I don't know the man."

Because the average American workman is intrinsically sound, the men chosen as his immediate superiors must also be thoroughly dependable. This is true, since all effort in any plant is to skim off the most capable men and give them supervisory rating.

Sometimes this fact may be momentarily lost sight of. The foreman is certainly the key man of industry, but he is also the individual most easily attacked by any critic of our way of doing things—particularly in any case where our free enterprise system is under attack.

**The foreman is no fool or he could not be boss man for 20 to 200 workers. He can be altogether articulate when he believes this sort of thing is called for; but as a rule he appreciates that unfair criticism of him and his work from outsiders is just one of the things that goes with his job. He feels that if the criticism is merited he will no doubt**



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***"... the foreman believes that his superior, rather than any outsider, knows exactly how to get out production ..."***

hear from his own boss, and matters can then be straightened out without delay. At such a time he can and will state his case, and his reasons for any action he has taken, succinctly and fairly, but only to his immediate superior.

As is true with law enforcement officers, he may at times offend some outsider who happens to wield considerable power in a community. *In such instance, he may be told flatly that this particular individual is going to "get his job" unless he does thus and so.* The foremen with whom I have worked as trainer state that anyone has a perfect right to thus sound off to them and they will listen carefully to what this person has to say. Thereafter they will continue to get out production exactly as in the past, until such time as their immediate superior—perhaps a general foreman or superintendent—suggests that certain changes in methods of dealing with subordinates are advisable.

In so doing the foreman is not being arbitrary; he merely believes that his superior, rather than any outsider, knows exactly how to get out production and should be the first to know and tell him when something he is doing is out of line. Until then, he is going to continue using the methods that experience has proved to be the best, meanwhile always listening courteously to criticism.

I have seen many instances when this characteristic of a typical fore-

man was of great value to his plant. Because of his unique close relationship with his subordinates, he may prove a target for criticism, either by those who dislike his particular plant (that is, his management) or those who are opposed in principle to our way of life. The truth is, the only people in a position to criticize intelligently any foreman's work are his subordinates and his immediate superior. And criticism from subordinates should be fairly unanimous and deal with the same things. Any other fault-finding from members of the work force may be attributable to any of a score of motives that have no bearing on how well he does his job.

**In the years ahead,** the foreman's job may become tougher or



***"... for many years now we have experienced good times wherein we have had maximum production and employment."***

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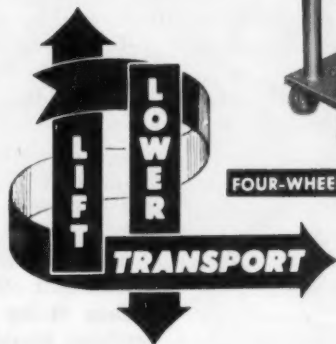
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***"... the foreman will have the final say as to who stays on the payroll and who is to be dropped."***

easier due to many conditions that are altogether beyond his control, and such variation may result in sharp criticism of the man himself. *Thus, for many years now, we have experienced a period of good times wherein we have had maximum production and employment.* It is unreasonable to believe this condition will remain unchanged indefinitely. Due to circumstances which neither management nor the foreman can change, any plant may find it necessary to make sharp cuts in the number of its employees; sometimes it will become inevitable that pay rates be lowered.

We have not heard much of the word "retrenchment" in recent years, except sporadically, as it has applied to specific industries. But not even the best informed

economists of today are quite sure what is going to happen in industry during the next five years. There are so many factors that must be considered, both at home and abroad, which have never existed before, that the wisest forecaster moves slowly in making firm predictions about anything. This fact is brought sharply home to anyone who reads a number of our professional newspaper columnists daily. Certain of these have "viewed with alarm" almost any political or economic change that has occurred. This type of columnist makes a living by keeping his readers in an uneasy frame of mind.

*But recently many of those columnists who have attained a reputation for detached fairness in commenting on current events have become emphatic in their discussion of present trends, and much of their comment is unfavorable.* As I will show in a moment, this feeling of uneasiness is shared by many government officials.

**One thing is certain:** Should anything whatever lead to a general period of retrenchment in industry, the foreman's job must become a very tough one. For, under such conditions, he will have the final say as to who stays on the payroll and who is to be dropped. If he is the sort of supervisor we have been discussing throughout these pages, he will display excellent judgment here.

Again, during these same years,



*"... columnists who have attained a reputation for detached fairness have become emphatic in their discussion of present trends."*

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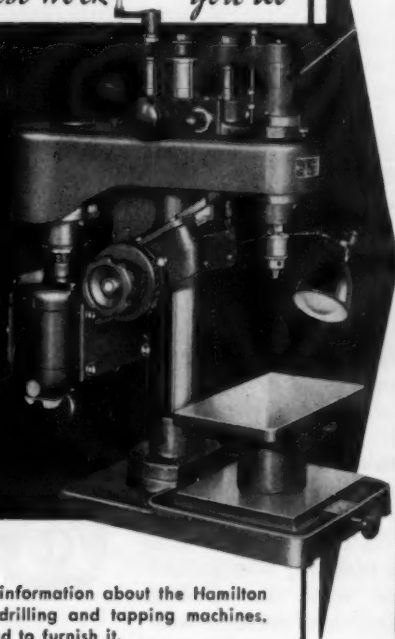
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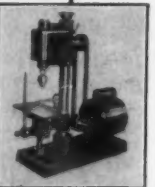
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**"... when nations spend billions to build terrible weapons, sooner or later someone will try them out . . ."**

there probably will develop recurrent world crises which will bring about threats of warfare on a titanic scale. I have said that the American worker is a solid realist, and he has become inured to the sort of war talk that often accompanies political maneuvering. He is not easily thrown off balance by this sort of thing; nevertheless he appreciates the possibility that some fool may yet pull the lanyard that will unleash the horrors of nuclear warfare on the world.

This fear is by no means confined to our workmen. I find it in the back of the mind of everyone I talk to. There appears to be a definite feeling that, when nations spend so many billions to build these terrible weapons, sooner or later someone will find it imperative to try them out—just as we did at Hiroshima and Nagasaki.

**The situation that will then ensue defies description.** In an earlier article I discussed the duties of a foreman in time of total warfare, but that material was gathered at a time when the United States alone possessed nuclear weapons. The assumption could then be made that any of our plants could be destroyed in time of war, but that these could at once be rebuilt. Emphasis, therefore, was placed on the foreman's responsibility for maintaining a high degree of morale among his subordinates under conditions that might then reasonably be expected to exist.

In discussing the type of warfare we must expect when nuclear weapons are employed, the director of civil defense for the State of California (a gentleman who is noted as a cold realist) recently gave me an insight into conditions which must prevail that were truly appalling. In such event, as he put it, civilians had three choices. They could dig, run, or die. And all expert opinion, he went on, favored running.

Even so, he said, the intent within the Los Angeles area, where 8,000,000 people lived and worked, was to remove as many as possible of these inhabitants to safer inland zones as quickly as possible, but to do this properly a period of three to four weeks would be required.

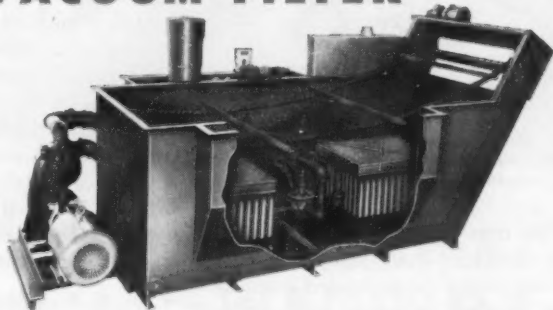


**"... the director of civil defense recently gave me an insight into conditions which must prevail that were truly appalling."**



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**"... the foreman would continue to function until the last productive unit serving the civilian population was abandoned."**



*"These particular men, together with their foremen and city and county police officers, would be the very last to leave."*

And no one—certainly not this defense director—had any assurance that we would be accorded even 24 hours' notice of such an attack. This same situation would, of course, apply also to the 200 target areas throughout the country.

Nevertheless, this only possible plan for successful evacuation gave the factory foreman a definite share of responsibility in making it work. That is, each plant in Los Angeles would remain in service until the last possible moment, with a skeleton crew on hand. *These men, together with their foremen and the city and county police officers, would be the very last to leave.*

Obviously, even the partial success of any plan of civilian survival would depend primarily on two

things: sufficient advance notice of attack, and the morale of the evacuees. Particularly would this latter be true in the case of those workers who must remain on the job while all others were being evacuated.

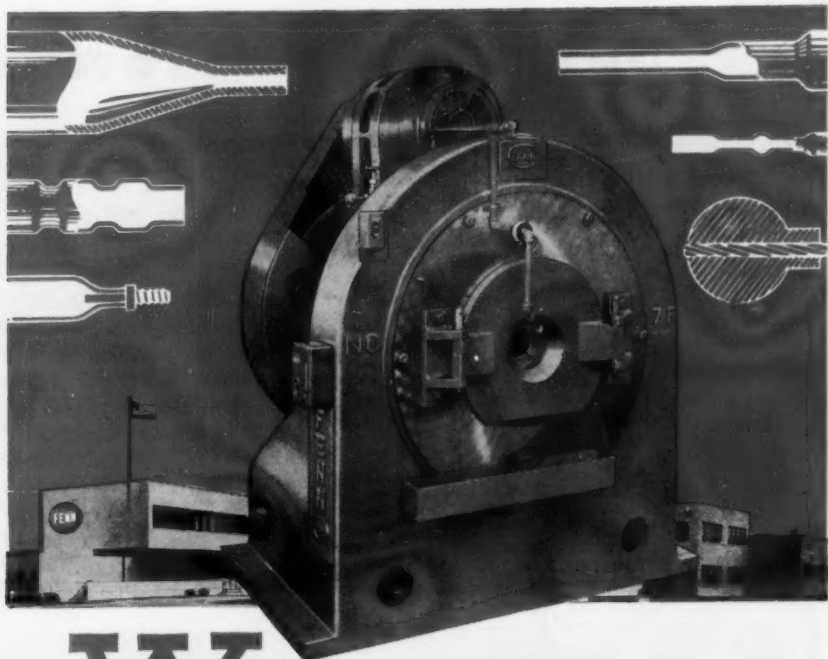
**Thus, the foremen would continue to function** until the last factory, powerhouse, or other productive unit serving the civilian population of the area was abandoned. This fact should surprise no one familiar with the type of men we have in America as industrial foremen. In time of great stress we can depend upon these supervisors to do their job with little fuss, whether we suffer enemy attack or whether their difficulties deal with the far less sensational problems that arise in time of peace.

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TO OPERATOR**

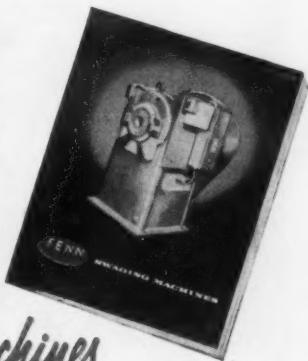


*"Couldn't you move me? I'm lonesome!"*



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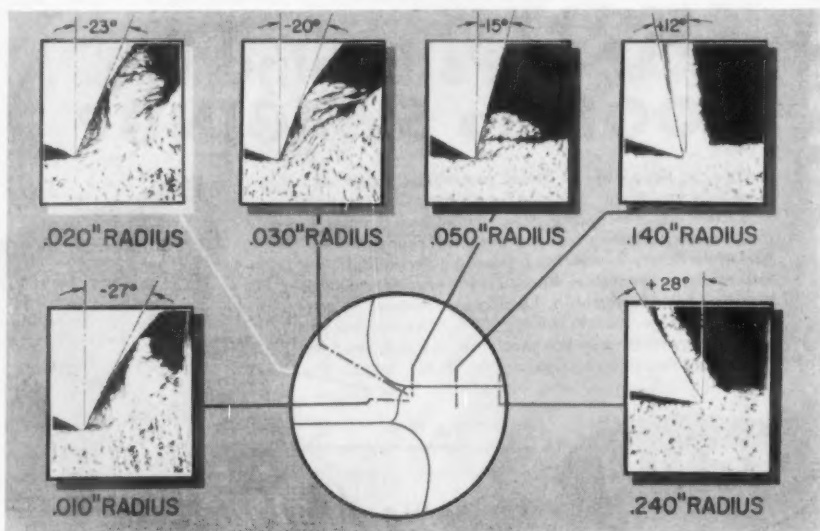
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# Spiral Point Provides No

***Intensive research results in the development of a new drill point form as well as a revolutionary grinding machine.***

**A completely new drill point geometry** has been developed by The Cincinnati Lathe and Tool Co., 3207 Disney St., Cincinnati 9, Ohio, which can be economically applied to the twist drill. In recent years, a great deal of work has been done in studying the performance of drills with respect to forces and flute shape and point angle, and other features of drill design. It seems to have been generally ac-

cepted that a drill should have a chisel point—perhaps because it always had one, or because it was the easiest shape to grind. Hans Ernst, Director of Research and W. A. Haggerty, Research Supervisor, Applied Metal Cutting and Grinding Research at The Cincinnati Milling Machine Company asked the question, "Why use a chisel shape for a point?" The answer came back each time the question

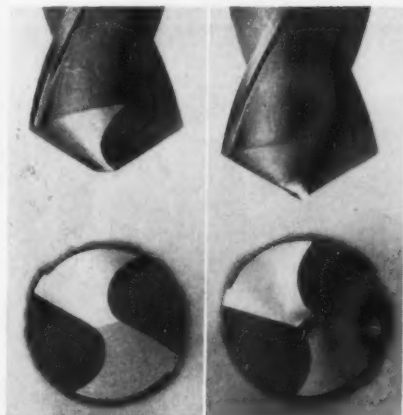


Photomicrographs of sections through spiral point drill and partly formed chips at successive points along the cutting edge of the drill from the axis to the periphery.

# es New Twist For Drills

was asked, "It isn't a point at all; it can't possibly give a centering action."

In practice, one end of the chisel edge is often slightly higher than the other due to small imperfections in symmetry of grinding. Hence, conventional drills usually tend to "walk" to one side or other of the desired hole location unless restrained by guide bushings or fixtures, or by the use of center-punched holes in the workpiece. Also, because of the chisel point, the cutting action is extremely bad near the center of the drill because of the very large negative rake. Studies of possible point configurations



(Left) Conventional chisel point drill; (Right) New Spiral Point Drill form.

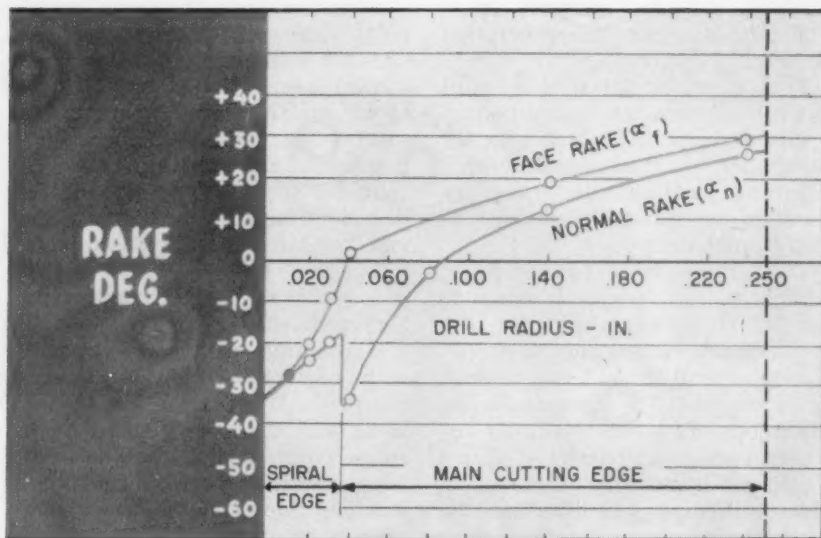
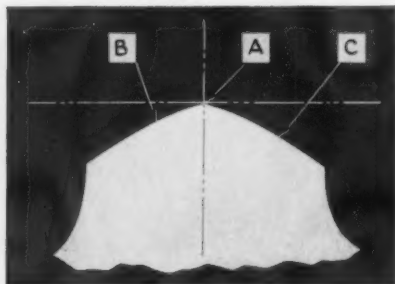


Chart showing relation between normal rake, face rake, and radius for  $\frac{1}{2}$ -inch diameter spiral point drill. The values for  $\alpha_n$  are calculated for zero feed rate.

**"The spiral point drill automatically centers itself on axis of drill at the instant of engagement with the work."**



This diagram shows the intersecting arcs of the secondary cutting edges (B) and (C) on a spiral point drill which form a sharp point coincident with the axis (A).



Illustration showing comparison of roundness of hole and self-centering action of a spiral point drill in contrast to erratic action of a conventional chisel point.

led to the conclusion that it was indeed practicable to develop an improved point shape and also an effective means for the generation of same.

First to be developed as a result of the study was the "spiral point," a new concept in drill design for which are claimed the following significant advantages over the standard or conventional type of chisel point drill:

- (1) It produces a rounder, straighter hole, which is truer to size;
- (2) it increases drill life;
- (3) it eliminates center punching;
- (4) it reduces drill thrust force as much as 34 per cent;
- (5) it produces less workpiece distortion because of cooler cutting and reduced thrust force;
- (6) it maintains accuracy in hole positioning;
- (7) it reduces the need for secondary operations, such as reaming, in many instances; and
- (8) when applied to sheet metal, it

produces a round, practically burr free hole.

As indicated by the name "spiral point," the entire flank surface, associated with each cutting edge, is formed as a three dimensional spiral surface extending from the axis of the drill to its periphery. Because of the way in which these spiroidal surfaces are ground, the drill is formed with a true point and has a free cutting action close to the axis. The chisel edge is gone and, in its place, is a characteristic S-shaped cutting edge.

The spiral point drill automatically centers itself on the axis of the drill at the instant of engagement with the work. Wherever the spiral point touches the work surface, it enters and remains in that location; there is no tendency whatever to travel or crawl to one side or the other, as in the case of the chisel point. It is, therefore, usual-



December, 1957

**"Because of the self-centering action, holes produced are usually rounder, straighter, closer to desired size and smoother . . ."**

ly unnecessary to use center punches or guide bushings to determine or maintain the proper location of a hole.

Because of the self-centering action, the holes produced with the spiral point drill are usually rounder, straighter, closer to the desired size and smoother than obtainable with the chisel point drill.

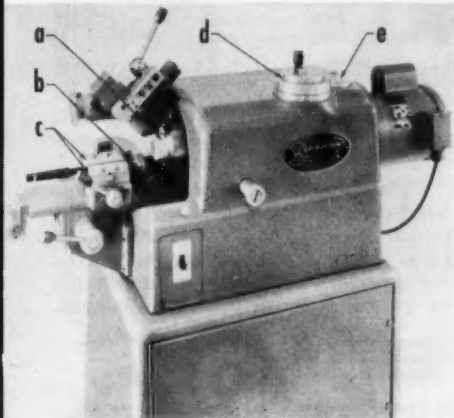
The second development resulting from the study of drill design is a machine which will grind the spiral point geometry accurately and economically. A machine having these qualities has been named the Spiropoint Drill Sharpener. This machine has been so designed that the drill is held stationary, while the generating system gyrates around it.

The small tubular grinding wheel,

(a), is mounted in a rotatable carrier, so arranged that the desired shape is generated on the end of the drill, as the grinding wheel gyrates around the drill axis. An adjustable truing device is provided for the grinding wheel, so that the point angle of the drill may readily be varied from about 90 degrees to 180 degrees.

In operation, the drill is oriented against a retractable control bushing, (b), and clamped in the jaws, (c). It is then advanced so as to engage the continuously gyrating grinding wheel until the desired amount of stock has been removed. The entire sharpening operation is very rapid. A simple dial indicated adjustment, (d), provides the correct combination of radial and axial motions for any desired size of drill. Adjustment for values of relief above or below the standard amount (to meet special requirements) may be provided by rotating the second adjustment dial, (e).

The extensive shop trials and laboratory tests, conducted with the spiral point, have produced results which indicate that this new drill point geometry constitutes a significant contribution to drilling practice, both from the viewpoint of improved quality and accuracy of holes and higher production. With the Spiropoint Grinder, this three dimensional spiral form can now be generated on any type of drill at a cost no higher than that for producing the conventional chisel point.



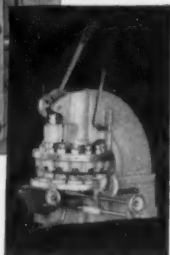
**Cincinnati Spiropoint Drill Grinder in which the drill is held stationary.**

# *new Di-Acro<sup>\*</sup> turret punch press*

## Accurate Burr-Free Punching at 12 Rotating Stations



Dial a hole in a jiffy. Micro-meter front operated back and side gauges provide instant gauging.



The new Di-Acro 4 Ton Turret Punch Press provides rapid, close tolerance punching of round, square, oval and rectangular holes from 1/16" to 2".

Rotating turrets provide rapid indexing for single or sequence punching. Precision hole location quickly obtained with Micro-twin gauges. Punches sheet metals up to 16 gauge mild steel, fibre-

board, asbestos, paper, cork, leather, rubber, plastic and other sheet materials.

Dies are mounted in turrets—always handy. Standard clearance between punch and die is .002". Choice of 6 other clearances at no charge. The Di-Acro Turret Punch Press is safe, simple to operate—requires little maintenance.



Consult the Yellow Pages of your phone book for the name of your nearest Di-Acro distributor or write us for catalog describing this and other Di-Acro machines.



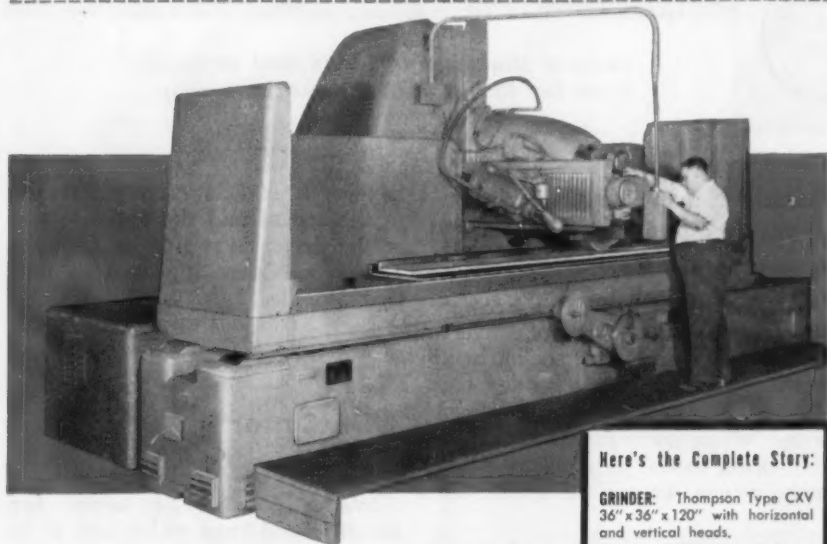
### **O'NEIL-IRWIN MFG. CO.**

*\*pronounced die-ack-ro*

306 8th Avenue • Lake City, Minn.

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**When large parts must be ground  
to total tolerances of .0005" or less . . . .  
THOMPSON GRINDERS WITH THE NEW  
HYDRA-COOL HYDRAULIC SYSTEM SOLVE THE PROBLEM!**



Machine ways up to 118" for The Michigan Tool Company's Roto-Flo Spline Rollers must be ground to .0005" total tolerance. Heat distortion, caused by hydraulic heat, became a critical problem in achieving this tolerance.

During the three months of operation since the installation of Thompson's new Hydra-Cool Hydraulic System\*, these long ways are being ground to consistent .0003"-.0004" total tolerances. Heat distortion is eliminated. Scrap loss is reduced to zero. Grinding time is greatly reduced.

**THOMPSON GRINDERS WITH THE NEW HYDRA-COOL HYDRAULIC SYSTEM MAY BE THE ECONOMICAL SOLUTION TO YOUR GRINDING PROBLEM. WRITE TODAY FOR FULL PARTICULARS.**

Hydra-Cool also offers you these exclusive advantages:

- Heat damage to hydraulic seals, valves, controls and pump is eliminated.
- Break down of additive-type hydraulic oils is prevented—sludge will not form in the Hydra-Cool System.
- Lengthy warm-up periods are eliminated.
- Power costs are greatly reduced.

*Hydra-Cool is standard on all Thompson surface grinders 40 inches and up in work length AT NO EXTRA COST.*

**THE THOMPSON GRINDER CO., Springfield, Ohio, U. S. A.**

\*Pat. Applied For

*"Keep THOMPSON in mind for that daily grind!"*

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**December, 1957**

**modern machine shop 159**

**Here's the Complete Story:**

**GRINDER:** Thompson Type CXV 36" x 36" x 120" with horizontal and vertical heads.

**PART:** 118" way for Michigan Tool Co. Roto-Flo Spline Roller.

**RATE OF TABLE TRAVEL:** 100 ft./Min.

**MATERIAL REMOVED:** .065".

**METAL:** Flame hardened Ductile Iron.

**WHEEL:** 20x4x12 H Grade.

**SCRAP LOSS:** None.

**GRINDING TIME:** 3-4 hrs.



## ideas from readers

**Several time-saving ideas and suggestions for the man in the machine shop.**

### Socket Screw Driver Made from Broken Tap

By FEDERICO STRASSER

An excellent use for a broken or wornout tap consists of converting it into a driver for socket head screws. To do this, the broken end of the tap is ground to a hexagonal shape which corresponds in size to the socket in the head of the screw to be driven. To use the driver, the

hexagonal end is merely inserted in the socket and the opposite end of the driver is turned by fitting a proper tool over the squared portion provided.

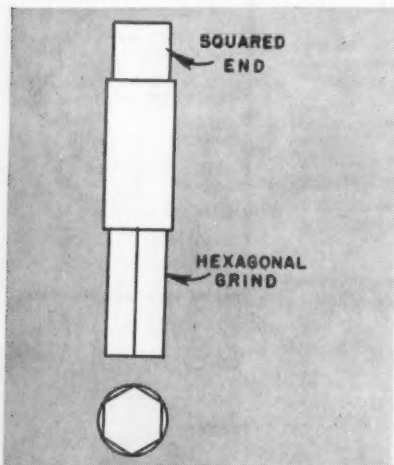
★ ★ ★

### Wire Cutter

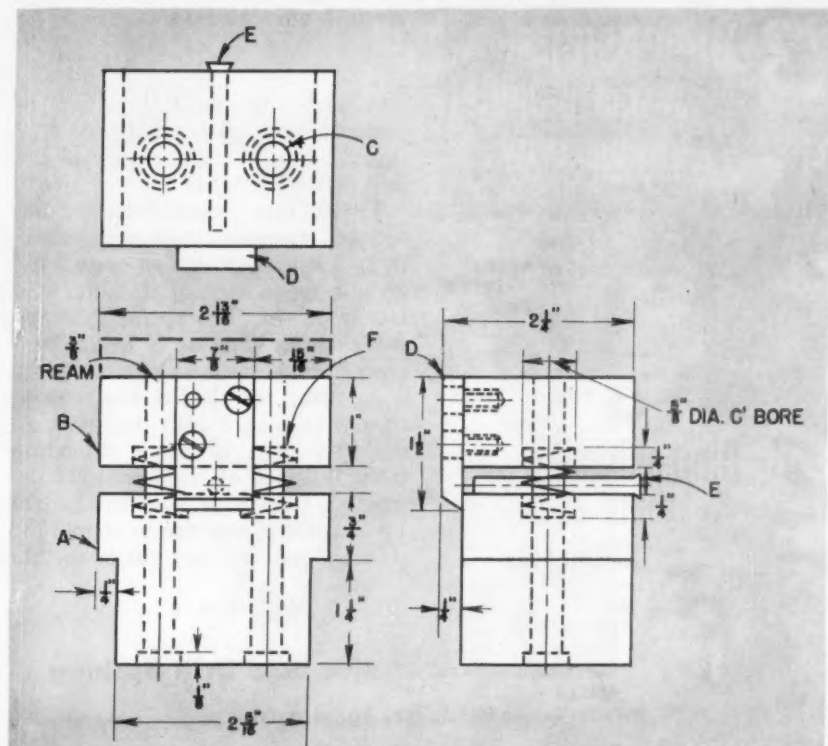
By ROBERT HILL

We had a large order for small metal tags which had to be shipped to the customer in bundles of 300. Wire was to be used for holding the tags together which meant that a separate piece of wire had to be cut for each bundle. Using wire snips for this job was a tiresome as well as time consuming task. As a result, a small press cutter of the type shown in the accompanying drawing was devised to cut the wire on a mass production basis.

The base, A, and the slide, B, are made of ordinary cold rolled steel. The holes in the base and the slide are machined in both piece-parts in one setup by clamping the two piece-parts together in a vise and drilling and reaming same. Guide



Sketch of socket head screw driver that can be made from broken tap or wornout tap.



Drawing showing top, side and end views of device for production wire cutting.

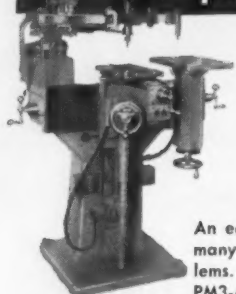
pins, C, are fitted in the holes, as shown, the pins being sufficiently long to provide a good bearing for the slide when same is in the closed position, as shown in the drawing. A shoulder is provided on each side of the base to prevent the unit from slipping in the vise while it is in operation. The top portion of the base is case-hardened to provide a durable cutting edge for the blade, D. The cutting blade is made of tool steel which is hardened and ground to provide a 60-degree cutting edge on the blade. The latter is fastened

to the slide, B, by means of two cap screws and a dowel pin. The blade can be readily removed when dull, ground and easily replaced in its original cutting position.

The guide pins, C, are made of cold rolled steel and are provided with a shoulder on their lower portion. The pins are pressed into the base, A, and have a snug sliding fit in the reamed holes in the slide, B.

A tube, E, is provided for the guiding of the wire that is to be cut, the tube being flanged on one end to facilitate insertion of the wire

## 3-Dimensional panto-miller

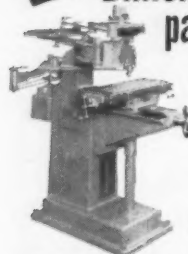


Accurate pantographic milling on either flat or curved surfaces.

**New**  
**CAPACITY**  
**SENSITIVITY**  
**ACCURACY**  
**CONTROL**

An economical answer to many production problems. Send for Bulletin PM3-A.

## 2-Dimensional panto-miller



Versatile and dependable for continuous service, the J&B "Panto-Miller" 2A:

**ENGRAVES**  
**PROFILES**  
**DIE CUTS**  
**MILLS**

Write for Bulletin PM2-A.

## 3-WAY Indexing Trunnion

WITH FACE PLATE

Simple, Rapid, Positive positioning of workpiece or jig for all angle Drilling, Tapping, or Counter-boring. Available with Chuck, Faceplate, or Right-Angle Adaptor Plate. Complete with Station Selector. For details, ask for Bulletin IT3-A.

AVAILABLE  
SIZES  
7", 10",  
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WITH  
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**JOHNSON & BASSETT INC.**  
**PRODUCTION TOOL DIVISION**  
WORCESTER, MASSACHUSETTS

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ideas from readers . . .

into same. The tube is brazed or soldered onto the base, *B*, in a true straight line at right angles to the face of the blade, *D*.

Fitted into counterbored holes between the base, *A*, and the slide, *B*, is a spring, *F*, which causes the slide to move upward after the wire has been cut. The spring is made from spring steel to a length and diameter to meet requirements.

In using the device, the wire to be cut is placed into the tube, *E*, with the end of same extending from the face of the cutter. If desired, a measuring stop can be set up in front of the vise to enable the wire to be accurately cut to certain lengths.

\*\*\*

## Adjustable Drill Bushing

By ROGER ISETTS

Many times when designing a drill jig for several different parts on short-run production jobs, bushing adjustment is desirable. A simple, easy-to-devise method of making the bushing adjustable is shown in the accompanying sketch.

A slot, *A*, is end milled in the bushing plate, *B*, to a slip fit with the outside diameter of the bushing, *C*. Two holes are tapped in each end of the slot to accommodate headless set screws, *D* and *E*, which are used to secure the bushing in place after adjustment is made. If desired, lines can be scribed on the bushing plate, as shown at *F*, along with a single line and on the head



# H LES JIG GROUND with

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Provide yourself with this inexpensive\* instrument for use on your present equipment and JIG GRIND with a guarantee.



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11 minute  
movie on  
Jig Grinding.

A five station indexing fixture from Vulcan's Contract Tool Room (Your tool room in Dayton). Using a jig borer index table with the Vulcanaire 5 indexing holes and 35 locating and clamping holes were JIG GROUND in place. Result—eliminated all close locating and dowelling of individual parts and of course hours of time.

\*Vulcanaire equipment pays for itself on the first job.

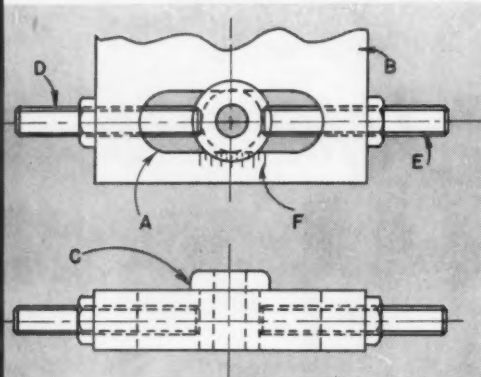
Services { ENGINEERING • PROCESSING • BUILDING • TOOLS  
DIES • SPECIAL MACHINES • VULCANAIRES JIG  
GRINDERS • MOTORIZED ROTARY TABLES • BREHM  
"SHIMMY" AND RELATED DIES • AUTOMATION

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### *ideas from readers . . .*



*Sketch of adjustable drill bushing design.*

of the bushing itself to permit easy location when setting up a new job.

While this method is not recommended for high production or extremely precision work, it has been found very useful in holding down costs of short-run parts without sacrificing quality or efficiency.

★ ★ ★

## **Preventing Mutilated Threads in Threading Short Stepped Workpieces**

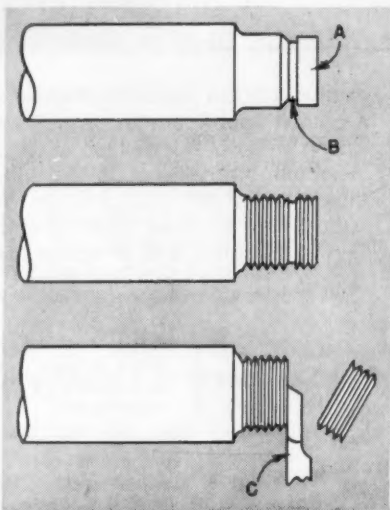
By H. J. GERBER

**It is often difficult to make a clean start with a die head** on an extremely short blind cut. This is particularly true when the chaser chamfer has been reduced in order to allow for production of a maximum number of full threads. The result is often a mutilation or tear-

ing of the first threads as the die head engages the workpiece.

A simple remedy to this problem is depicted in the accompanying sketch. A short additional starting stub, *A*, is left on the workpiece ahead of the portion to be threaded. This starting stub is made about 0.010 to 0.020 inch smaller than the normal diameter of the finish threaded step. It is separated from the finished work by a groove, *B*, which is cut into the part with a form tool to leave an angle which serves as the chamfer of the finished thread.

In operation, the die picks up its lead on the stub, *A*, and follows through in a clean cut to the stepped portion. After the latter has been threaded, the stub is cut off, as indicated at *C* in the sketch.



*Sketch showing an effective method for preventing mutilated threads in the die head threading of a short stepped workpiece.*



**NEW GULFCUT**  
**HEAVY DUTY SOLUBLE OIL**



*For heavier cuts . . . at higher speeds . . .  
with longer tool life . . . even in turning  
chrome-nickel steels and other tough alloys!*

# **NEW GULFCUT**

## **HEAVY DUTY SOLUBLE OIL**

**increases the efficiency of a wide range of machining and grinding operations. Here's why:**

- 1.** Its lubricating-cooling-protective properties meet the heavy-duty machining needs of today!
- 2.** It permits higher speeds, deeper cuts . . . gives finer finishes, longer tool life . . . offers greater protection against corrosion . . . helps eliminate rancidity!
- 3.** It performs efficiently even when mixed 1 to 150 parts of water . . . and has exceptionally long service life!

This new Gulf product is a heavy-duty soluble cutting oil with a petro-chemical emulsifier. Its applications include heavy hogging cuts, fast fine cuts, boring, and grinding of ferrous materials, tough alloys—such as titanium and chrome-nickel-moly steels—and soft, non-ferrous metals, such as aluminum.

Shop-proved Gulfcut Heavy Duty Soluble Oil won't separate or gum in wheels, slides or ways. It contains a potent rust inhibitor which provides greater protection against rust and corrosion. It has excellent emulsion stability even in hardest water. It has high surface-wetting properties for more effective cooling. It is anti-weld, anti-wear and anti-foam. Also contains an effective germicide to help eliminate rancidity and odor.





In machine shop tests, new Gulfcut Heavy Duty Soluble Oil has been producing such outstanding results as: finishing to tolerances of 5 or 6 microns, where formerly only 16 to 18 microns were obtained . . . and grinding 100 pieces without wheel dressing, as compared to former grinding of less than half that number of pieces before dressing.



Gulfcut Heavy Duty Soluble Oil has high surface-wetting qualities, for more effective cooling. To protect against rusting, 3 anti-corrosion agents are combined.

## Independent machine shop tests prove the superiority of **GULFCUT HEAVY DUTY SOLUBLE OIL**

Here are some of the first field reports on performance:

- "Grinds twice as many pieces before wheel dressing!"
- "Makes possible increase in depth of cut from 1/4" to 1/2" per pass!"
- "Now able to hold tolerances of 6 microns, instead of 16!"
- "Has made possible increased boring speeds!"

Get the full efficiency-economy story on this new oil now! Call your Gulf Sales Engineer, at your nearest Gulf office, or mail the coupon.

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### **GULF OIL CORPORATION**

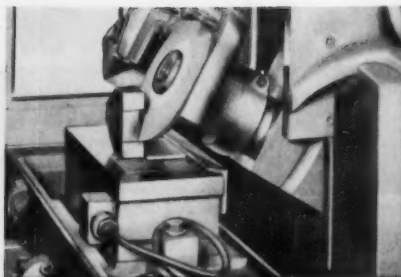
Dept. DM, Gulf Building  
Pittsburgh 30, Pa.



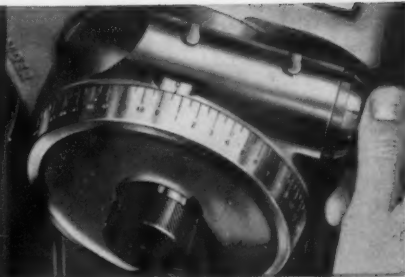
**THE FINEST  
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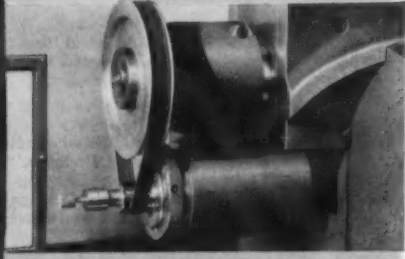
**Spindle Tilting Attachment** for Tilting Wheelhead allows precision setting of spindle block through an angle of approximately 30°. Exclusive Taft-Peirce angular surface grinding cuts set-up and grinding times in half! Just set workpiece on magnetic chuck, dress wheel and grind. No problem with burrs, working over-size, curved surfacing, or wheel glazing. Big savings in cost and quality control.



**Vernier Fine-Feed** permits extremely fine grinding fast and accurately. Unique T-P "Spark Test" shows how the No. 1 can repeat to .00005" . . . with surfaces so smooth, in many cases, they seal without lapping. Fine-feed, graduated in .0001" increments spaced 1/5" apart, is available for either the horizontal or vertical feed.



**Riser Block** provides an extra 12" clearance under the wheel. Block replaces column cap, provides a bore for the spindle quill and permits grinding work up to 24" in height.



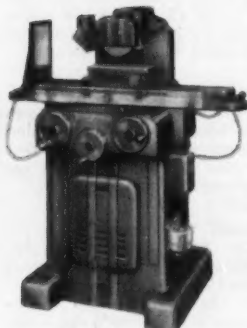
**High Speed Grinding** attachment proves extremely useful for the grinding of angles or slots too small for standard wheels. Ball bearing spindle clamps to main spindle quill, operates at 18,000 rpm.

## Extra Features make the "No. 1" your Most Profitable precision tool

No need to go looking (or try and "make do") when you want extreme precision or extra flexibility on a surface grinding job. It's all yours in the Taft-Peirce No. 1. For tool room or production line, this precision surface grinder gives you the key three for profits: Output, quality and economy.

Shown here are just four of the some seventeen attachments and accessory equipments available to you with the T-P No. 1 Grinder.

**See for yourself!** Each of these features means extra savings — see them demonstrated and judge for yourself. Contact your local T-P representative or write: Taft-Peirce Manufacturing Co., Woonsocket, Rhode Island.



This is the Taft-Peirce No. 1 Grinder



## TAKE IT TO TAFT-PEIRCE

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WOONSOCKET, RHODE ISLAND



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modern machine shop 165

## new literature

**Use Postpaid Cards opposite page 32  
and inside back cover for requesting  
free copies of literature listed below.**

**1. Diamond Tools**

Abrasive Dressing Tool Co., 14530 Second Blvd., Detroit, Mich. Complete line of diamond tools. The diamonds are all whole natural stones.

**2. Stamping Press**

The Acromark Co., 9 Morrell St., Elizabeth 4, N. J. "How to Mark Manufactured Products." A booklet describing and illustrating the equipment for applying lettering, numbering, design and other markings on metal, plastic and other materials.

**3. Air Impact Wrenches**

Albertson and Co., Inc., Sioux City, Iowa. Reversible controlled power Sioux air impact wrenches convert quickly into drill, reamer, taper, screwdriver and so on.

**4. Copper and Copper Alloys**

The American Brass Co., Dept. RS, Waterbury 20, Conn. A 60-page copper and brass warehouse stock list is now available.

**5. Drill Bushings**

American Drill Bushing Co., 5107 Pacific Blvd., Los Angeles 58, Calif. Delt-A-Grip, Hex-A-Grip or Serr-A-Grip Drill Jig Bushings.

**6. Bar and Wire**

Armco Steel Corp., Production Information Service, Middletown, Ohio. Serrated dials, high pressure safety valves, stacker springs, hydraulic pump shafts, and valve plugs are some of the applications included in the case history booklet on 17-4 PH and 17-7 PH stainless steel bar and wire.

**7. Honing Tools**

Barnes Drill Co., 860 Chestnut St., Rockford, Ill. Slotted, flange, horizontal and the Barnes-driL Plate Type Honing Tool.

**8. Heat Treatment of Croloy**

The Babcock and Wilcox Co., Tubular Products Division, Beaver Falls, Pa. Technical data on the heat treatment of Croloy 2 1/4 (Grades T22 and P22). It details the yield strength, tensile strength, elongation, reduction of area and Brinell hardness at various annealing temperatures.

**9. Machine Mountings**

Barry Controls, Inc., 783 Pleasant St., Watertown, Mass. A case history describing the use of Barry Mounts in connection with punch presses.

**10. Abrasive Machine**

Campbell Machine Division, American Chain and Cable, 931 Connecticut Ave., Bridgeport 2, Conn. Abrasive cutting machine for thin wall or heavy wall tube cutting.

**11. Surface Grinder**

The Blanchard Machine Co., 64 State St., Cambridge 39, Mass. The No. 18-C Blanchard Surface Grinder is designed for either automatic cycle or manual operation. One cabinet, separate from the grinder, holds all the control units. Push buttons and selector switches are mounted on the grinder convenient to the operator.

**12. Pins and Bushings**

E. W. Bliss Co., Cleveland, Ohio. An 8-page catalog describes a complete line of precision guide pins, shoulder guide pins and bushings and commercial guide pins and bushings and includes specifications and list prices for each.

**13. Industrial Batch Ovens**

Blue M Electric Co., 138th and Chatham St., Blue Island, Ill. Illustrated 4-page brochure on Blue M Temperature Control Equipment featuring Power-O-Matic Industrial Batch Ovens which have fully automatic proportional wattage control and temperature range to 600 degrees F. with a capacity from 16 to 95 cubic feet.

#### 14. Planer and Shaper Gage

Brown and Sharpe Manufacturing Co., Providence, R. I. No. 624 planer and shaper gage for precisely setting cutting tools on planers, milling machines and so on.

#### 15. Turret Drills

Burg Tool Manufacturing Co., Inc., 15001 S. Figueroa St., Gardena, Calif. Current data on Burgmaster Models 2BH and 3BH Automatic Hydraulic Turret Drills. On Model 3BH, any combination of 8 operations can be performed in one set-up, and on Model 2BH, any combination of 6 operations.

#### 16. Electric Engraving Tool

Burgess Vibrocrafters, Inc., Dept. D-4, Grayslake, Ill. The Electric Vibro-Graver is used in toolrooms, inspection departments, and on production lines for permanently marking parts, jigs, dies, tools and cutters.

#### 17. Abrasive Products

The Carborundum Co., Niagara Falls, N. Y. "Toolroom Grinding of Alloy, High-Speed and Die Steels" featuring aluminum oxide abrasives, properties and use, wheel shapes and markings, broaches, chasers, cutters, circular form tools and hobs, offhand grinding, tap sharpening, tool post grinders, drill sharpening, cutoff and slotting and so on.

#### 18. Surface Equipment

The Challenge Machinery Co., Grand Haven, Mich. Dove-tailed straight edges, magnesium and semi-steel straight edges, magnesium and semi-steel parallel straight edges and 3 point suspension surface plates.

#### 19. Carbide Cleaning Drill

Chicago-Latrobe, 419 W. Ontario St., Chicago 10, Ill. The Carbide Tipped Tube Cleaning Drill is designed for the efficient removal of both hard scale as well as soft coagulated deposits from inside walls of condenser tubes.

#### 20. Motor Units

Chicago Pneumatic Tool Co., 6 E. 44th St., New York 17, N. Y. Bulletin tabulates and illustrates more than 30 basic air motor units and torque limiting components for multi-spindle screwdrivers and nutrunners. This information will prove helpful in understanding the principal of operation and the proper application of Magnamatic, direct drive, stall torque impact types of torque-limiting clutches.

#### 21. Grinding Wheels

Cincinnati Milling Products Division, Cincinnati 9, Ohio. "Cincinnati Centertype Grinding Wheels"—features and applications.

#### 22. Drill Grinding

Cincinnati Lathe and Tool Co., 3207 Disney St., Cincinnati 9, Ohio. A 12-page catalog dealing with a completely new drill point geometry, which can be economically applied to the twist drill. Termed the "spiral point," this new concept in drill design is claimed to have many significant advantages over the standard chisel point drill.

#### 23. Hole Making Tools

Robert H. Clark Co., 9330 Santa Monica Blvd., Beverly Hills, Calif. Catalog featuring a heavy-duty Clark Hole-Mill, a combination adjustable spot-face and counterbore, the 3-blade hole makers and hole cutters, a circle cutter and other Clark tools.

#### 24. Bending Press

The Cleveland Crane and Engineering Co., 6449 E. 281st St., Wickliffe, Ohio. Steelweld bending presses for braking, forming, blanking, drawing, corrugating and punching.

#### 25. Sockets, Collets, Sleeves

The Collis Co., Dept. A, Clinton, Iowa. A 20-page catalog illustrating and describing drill sockets, drill sleeves, cutter bars, chucks and collets, taper sleeves, lathe centers, sockets and arbors, lathe bushings, and pipe centers.

#### 26. Die Set

Danly Machine Specialties, Inc., 2100 S. Laramie Ave., Chicago 50, Ill. Tolerances on the intricate shaft-mounted spring die set are plus 0.003 inch, minus 0.000 inch.

#### 27. Oven

Despatch Oven Co., 381 Despatch Bldg., Minneapolis 14, Minn. Information concerning the RS-5 Oven for hard baking operations at temperatures up to 600 degrees F.

#### 28. Lifter

Economy Engineering Co., 4507 W. Lake St., Chicago 24, Ill. 2,000 pound capacity Type DX Shoplifter equipped with floor lock, hoist unit, platform lift, platform plate and so on.

#### 29. Magnetic Base Tools

Enco Manufacturing Co., 4520 W. Fullerton, Chicago 39, Ill. Complete line of turret tool posts, bed turrets and tailstock turrets and offset clamp rod supplied with models 150 and 160 to hold lugback indicators.

#### 30. Circular Bending Machine

Excelsior Tool and Machine Co., 31st and Ridge Ave., East St. Louis, Ill. Reversible circular bending machine rolls part or complete circles of angles, flats, pipes, rounds, squares, tees, channels, beams and special shapes.

**31. Vertical Mills**

Famco Machine Co., 3100 Sheridan Rd., Kenosha, Wis. A 12-page catalog illustrating and describing its 1 h.p. and 2 h.p. vertical mills.

**32. Punching Press**

Ferracute Machine Co., 489 E. Commerce St., Bridgeton, N. J. Standard throat non-adjustable bed 20 to 105 ton models. 40-ton punching press P-3 has scrap cutter, double roll feed, stock straightener and stock reel.

**33. Dies and Machinery**

Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa. Catalog covering line of Firthalloy dies machinery and Diecarb perforators being square and hexagon shape drawing dies; round wire, bar, and tube drawing dies; rough mandrel nibs; rough cored heading die nibs; nail and tack tooling inserts and so on.

**34. Oil Groovers**

Fischer Machine Co., Eleventh and Wood Sts., Philadelphia 7, Pa. No. 1 oil groover cuts grooves in bearings up to 8 inches in length and up to 5 inches inside diameter.

**35. Hydraulic Cylinder**

Flick-Reedy Corp., Miller Fluid Power Division, 2024 N. Hawthorne, Melrose Park, Ill. All Teflon sealed hydraulic cylinder.

**36. Feed Fingers**

Green Manufacturing Co., 122 S. Prairie Ave., Rockton, Ill. Information relative to master feed fingers with adjustable rubber inserts for automatic screw machines.

**37. Bar Machine**

Greenlee Bros. and Co., 1890 Mason Ave., Rockford, Ill. Automatic bar machines hold each piece within required tolerances.

**38. Deburring Machine**

Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich. An eight page catalog describing the Morrisflex semi-automatic gear spline deburring and radiusing machine for gears, splines, serrations and so on.

**39. Valves**

Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill. Flo-Pilot Valves are available in five basic models — ball cam, palm button, hand lever, locking hand lever and mechanical link clevis. These valves are 1/4 inch pipe size for two or three-way air operation to 150 p.s.i. They are also used for remote control of master valves, directional control of small single acting cylinders, and for shut-off.

**40. Hydraulic Presses**

Hannifin Corp., 565 South Wolf Rd., Des Plaines, Ill. Complete and latest line of hydraulic presses, air presses, power cylinders, directional air control valves and compressed air preparation units.

**41. Collet Chucks**

Hardinge Brothers, Inc., Elmira, N. Y. All types of toolroom lathes, engine lathes and grinders can make use of the Hardinge-Sjogren Speed Collet Chucks. They are fully described with their uses in a 12-page bulletin.

**42. Grinding Fixture**

Harig Manufacturing Corp., 5757 W. Howard St., Chicago 31, Ill. Grind-All Fixture for higher accuracy, greater range and maximum speed in grinding perforators.

**43. Vacuum Furnaces**

Hevi-Duty Electric Co., Milwaukee 1, Wis. Bulletin 557 containing full details, including dimensions, of standard single pump vacuum furnaces for temperatures up to 1600 degrees F. and double pump vacuum furnaces for temperatures up to 2100 degrees F.

**44. Diamond Holders**

Hoglund Engineering and Manufacturing Co., 343 Snyder Ave., Berkeley Heights, N. J. 4-page bulletin describes technique for optically presetting diamonds for use on contour wheel dressers. This catalog also shows how either pre-adjusted single or double diamond holders can be used to eliminate grinder down-time during diamond replacement.

**45. Gage Supplies**

Huron Machine Products, Inc., 6252 Monroe Blvd., Dearborn, Mich. Taperlock handles and blanks, thread ring gage blanks, thread ring gage holders, master setting disc blanks and insulating grips and so on.

**46. Clear Wax Emulsions**

S. C. Johnson and Son, Inc., Industrial Products Division, Dept. D-57, Racine, Wis. Clear wax emulsions used as protective coatings for rubber, plastics, leather and metal, also used as mold release agents, lubricants on steel strapping and shell cases, protective coatings for copper, brass and aluminum.

**47. Hydraulic Lathe Drives**

Jones and Lamson Machine Co., 521 Clinton St., Springfield, Vt. Custom installation of Lynn Hydraulic Drives for ram type turret lathes with completely automatic operation from start to stop is described in a 4-page folder.

Back of a *Chicago Rivet*

Is an Organization That Really Serves



There are  
**CHICAGO RIVET**  
machines that will set

1

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Tubular or Split  
Rivets At a Time

The RIGHT rivet, plus the RIGHT riveting machine will  
produce a fastened assembly at the RIGHT low cost

The correct combination of rivet and machine requires expert knowledge available to you through Chicago Rivet engineers.

Anticipated production, type of materials to be fastened, assembly shape and its expected service life are factors to be considered. Decisions must be made on a rivet metal or alloy. Type and size of rivet, shape of head and

shank, depth of tubular section must be all determined. Are indexing fixtures and multiple setters indicated? Can a standard rather than a special rivet be used? These are the type of questions Chicago Rivet Engineers are daily answering for industry. Their recommendations are available to you without cost. We suggest you send a blueprint or sample assembly with your inquiry.

*Chicago Rivet* & MACHINE CO.

963 South 25th Avenue  
Bellwood Ill. (Chicago Suburb)  
Branch Factory: Tyrone, Pa.

FOR YOUR FILES

Rivet catalog describing 1388  
standard tubular and split  
rivets and 26 single and  
multiple automatic rivet setters.



For more data circle 413 on Postpaid Card

December, 1957

modern machine shop 169

**48. Carbide Alloys**

Kennametal, Inc., Latrobe, Pa. Heat-resistant titanium carbide alloys and their applications in metalworking.

**49. Double Angle Shears**

Kling Brothers Engineering Works, 1320 North Kostner Ave., Chicago 51, Ill. All sizes of Kling Double Angle Shears with special attachments to meet specific requirements.

**50. Lathe Chucks**

L-W Chuck Co., 28 South St. Clair St., Toledo 4, Ohio. Lathe chucks, magnetic chucks, dividing heads, demagnetizers, rectifiers, milling machine vices and power hack saws.

**51. Hydraulic Presses**

Lake Erie Machinery Corp., 1001 Woodward Ave., Buffalo 17, N. Y. 16-page bulletin describes and illustrates its line of hydraulic presses for all industry. Facilities, engineering as well as production is described and also lists the equipment available for the manufacture of developed designs or the design, machining, assembly and testing of industrial machinery.

**52. Cylindrical Grinder**

Landis Tool Co., Waynesboro, Pa. 14 and 18 Type CH Universal Cylindrical Grinder.

**53. Hollow Spindle Lathes**

Lehmann-Brandes Machine Co., Chouteau at Grand, St. Louis 3, Mo. Hollow spindle hydraulic lathes provide a complete range of sizes with spindle holes from 3½ to 19½ inch diameter, larger holes upon request. These lathes incorporate such features as rugged bed, carriage, tailstock, power and sturdiness.

**54. Air and Vacuum Pumps**

Leiman Bros., Inc., 102 Christie St., Newark 5, N. J. Rotary positive air and vacuum pumps, gas boosters and air motors.

**55. Arcwelder**

The Lincoln Electric Co., Dept. 3516, Cleveland 17, Ohio. The Linwelder 100 makes welds in mild steel with Selfweld or with coated electrodes. This arcwelder handles Lincoln Planeweld 2, Fleetweld 180. It also welds cast iron with Lincoln Ferroweld electrodes, as well as cutting and heating metals.

**56. Coolant Applicator**

Mechanical Appliance Co., Dept. MS, 1111 N. Franklin St., Chicago, Ill. No Maintenance—automatically operates from quill, adjustable coolant discharge tube, are a few of the features of the "Squirt" coolant applicator.

**57. Speed Reducers**

Michigan Tool Co., Cone-Drive Gears Division, 7171 E. McNichols Rd., Detroit 12, Mich. Cone-Drive double-reduction reducers are made up of standard single reduction units, which feature double enveloping worm gearing, oversize taper roller bearings and rugged, ribbed housings for strength and high load-carrying capacity on small center distances. Output torque ratings range up to 618,000 inch-pounds.

**58. Embossing Press**

Minster Machine Co., Minster, Ohio. Knuckle joint embossing presses for sizing, coining, embossing and similar applications.

**59. Adhesive Bonding Machines**

Modern Industrial Engineering Co., 14230 Birchwood Ave., Detroit 38, Mich. A full line of machines for assembling parts of various materials by adhesive bonding is described in a 6-page booklet. The machines, in all models, feature positive control over all bonding factors. In addition, it discusses optional instrumentation and a line of cold-assembly presses that complement the bonding machines.

**60. Cutting-Off Machines**

Modern Machine Tool Co., 2005 Losey Ave., Jackson, Mich. 12-page catalog describing and illustrating cutting-off machines and automatic loaders, also hot spinning machines and safety drill tables.

**61. Marking Machine**

New Method Steel Stamps, Inc., 147 Jos. Campau St., Detroit 7, Mich. Numerical control of production parts in automated production-assembly lines through the use of an automatic marking machine is described in a 2-page bulletin. This is a special machine built for consecutive marking of serial numbers on engine cylinder blocks and the unique toggle linkage design used to control impression depth.

**62. Thread Rolling Head**

The National Acme Co., 183 E. 131st St., Cleveland 8, Ohio. Acme-Fette Series N, self-opening thread rolling head.

**63. Self-Locking Bolts**

National Machine Products Co., Utica, Mich. Information concerning slotted-type and self-locking "place" bolts.

**64. Setup Blocks**

Karl A. Neise, 404 4th Ave., Dept. MMS, New York 16, N. Y. Mermod setup blocks are adjustable in steps of 1/25 inch.



### FORGING DIE INSERT

Material: Heppenstall 'A'  
Conventional Machining

Time: 76 hours

Elox Setup & Machining

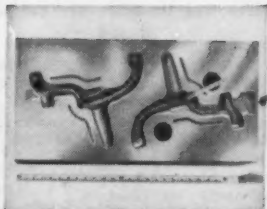
Time: 45 hours

Saved: 31 hours

Machine tool: Elox M-501 DieMatic

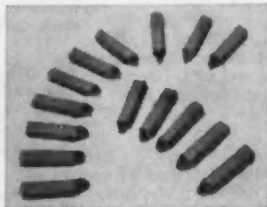
Electrode: Cast Elo-met

Customers report 50% saving on new forging dies and 75% savings in reworking dies.



### TUNGSTEN CARBIDE SINGLE POINT TOOLS

EDM produces 14 identically machined tools per hour. Times include roughing and finishing, machining both faces, nose radius and top. Radius held to  $\pm .001$ ". Tools were produced by 1 man operating 2 Elox Tool & Cutter Grinders, using a brass wheel. Users report Elox ground tools give greatly increased life when compared to abrasive ground tools.



### EMBOSSING DIE

Material: Air Hardened Tool Steel  
Die consists of 1,250 squares machined  $.100" \times .030"$  deep in the bottom section of the die. Sharp corners on each square had to be maintained.

Conventional Machining

Time: 227 hours

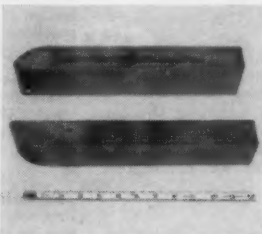
Elox Setup & Machining

Time: 10 hours

Saved: 217 hours

Machine Tool: Elox Standard M-500

Electrode: Free machining brass



### EXTRUSION DIE

Material: Air Hardened Tool Steel  
Conventional

Machining Time: 4 hours

Elox Setup &

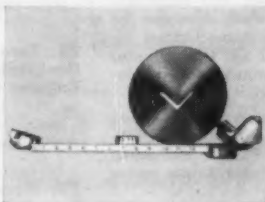
Machining Time: 1 hr. 38 min.

Saved: 2 Hrs. 22 min.

Machine Tool: Elox Standard M-500

Electrode: Free machining brass

Machining is done after final heat treating . . . eliminating the possibility of distortion.



FROM  
THE  
HEART  
OF

EDM



... 4 jobs  
that prove

Elox  
puts you  
ahead of  
competition

These jobs were done for Elox customers in our "Prove It" Division. There's more to them than just "man hours" saved. The Elox sales engineer in your area would like to give you all the details about these and other applications of Electrical Discharge Machining. Why not write . . .

**elox** corporation of michigan  
EST. 1942

1839 N. Stephenson Highway  
Royal Oak 3, Michigan

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December, 1957

modern machine shop 171

**65. Shear Machine**

Niagara Machine and Tools Works, Buffalo 11, N. Y. Model 33 RC Ring and Circle Shearing Machine has finger-tip control and power down-feed. Conveniently located pushbutton bring ease of operation by eliminating difficult hand feeding of cutters into plate. Designed to raise and lower the upper cutter quickly and easily, the power downfeed drives the upper cutter down into the material automatically as the cut progresses.

**66. Milling Cutters**

The O. K. Tool Co., Inc., Milford, N. H. Wedge type milling cutters featuring staggered tooth cutters, half size cutters, end mills-integral shank and shell, face mills-medium and heavy duty, blades, wedges and so on.

**67. Jaw Drill Chuck**

Oneida Machine Tool Corp., 700 E. Walnut St., Oneida, N. Y. One-inch capacity Westcott "Little Giant" heavy-duty 2-jaw drill chuck has vise-like grip, to hold true and firm and not injure the shank of the drill.

**68. Milling Machines**

Onsrud Machine Works, Inc., 7720 N. Lehigh Ave., Niles 31, Ill. A 24-page catalog covering the series of non-ferrous milling machines called the Onsrud "Mach-Mills" including data as to machine specifications, work capacities, hyper speed cutting heads and high feeds for the ultimate in the production rates for non-ferrous parts.

**69. Precision Measuring**

Opto-Metric Tools, Inc., 137 MM-10 Varick St., New York 13, N. Y. Fundamentals and essentials of precision measuring and inspection is now available in bulletin which discusses the differences between optical and mechanical inspection instruments and will aid the inspector in selecting the proper instrument for the inspection work to be performed.

**70. Socket Screws**

William H. Ottemiller Co., York, Pa. Alloy steel cone, oval flat and half-dog points socket screws.

**71. Arbors and Collet Chucks**

Pope Machinery Corp., Haverhill, Mass. Complete dimensional data on the Interchangeable Extension Arbors and Tapered Shank Collet Chucks for internal grinding spindles and milling spindles. 250 styles and sizes of Extension Arbors are listed and described. Also are the Pope Self-Removing Wheel Holders for all types and makes of tool and cutter grinders, vertical, cylindrical and surface grinders.

**72. Bending Machine**

Pines Engineering Co., Inc., 642 Walnut, Aurora, Ill. Information concerning bending machines for tubing, pipe, extrusions and rolled sections.

**73. Vee Block Angle Plates**

Lassy Tool Co., Plainville, Conn. An illustrated brochure showing the features and advantages of the Lassy Master Vee Block Angle Plate. This brochure is complete with prices showing two stock models, matched pairs and sine bar.

**74. Drop Hammer**

Pneumatic Drop Hammer Co., 2000 Adams St., Braintree 84, Mass. Stationary anvil and double action drop hammer for cold sizing and planishing of stampings and small forgings.

**75. Live Centers**

Pace Engineering Co., 1507-B E. Michigan St., Indianapolis, Ind. Taper roller bearing live centers preloaded with two precision matched Timken or Bower taper roller bearings for grinding, precision turning and heavy duty operations.

**76. Deep Hole Driller**

Pratt and Whitney Co., Inc., 25 Charter Oak Blvd., West Hartford, Conn. No. 1 1/2 Deep Hole Driller for drilling long true holes up to 2 inches in diameter.

**77. Grinder Millers**

Products Corp., Racine, Wis. Complete information on the precise super 40 and 45 grinder millers which feature new direct drive motor spindle that brings smooth, vibration-free and chatterless power flow to working spindle.

**78. Thread Rolling Attachments**

Reed Rolled Thread Die Co., Worcester 1, Mass. Bulletins containing engineering data pertaining to the application of the Reed Model B8 Thread Rolling Attachments for various automatic screw machines.

**79. Hack Saws**

Sales Service Machine Tool Co., 2355 University Ave., St. Paul 14, Minn. Ten models of Keller Power Hack Sawing Machines are manufactured to meet all cutting requirements up to 10 1/2 by 9 inch capacity.

**80. Marking Unit**

George T. Schmidt, Inc., 1806 W. Belle Plaine Ave., Chicago 13, Ill. The Marking Cruiser has four sizes of stamps, i.e., 1/16, 3/32, 1/8 and 3/16 inch, of 40 characters each.

Quick  
as a...

on a lathe  
specifically designed  
for production  
with accuracy and economy



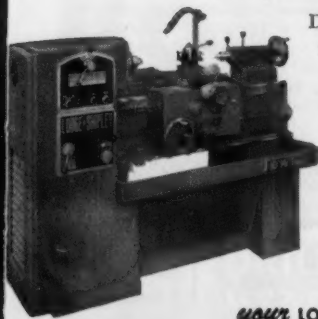
High speed turning, boring and facing are child's play . . . with the Lodge & Shipley HI-TURN Lathe. Whether on single or multiple-piece work, this 10" Production Lathe provides productive capacity at a price substantially below conventional lathes.

Designed for fast, convenient operation, it eliminates rarely used features, incorporates many standard features never before found at any cost in a lathe of this size.

The 10" HI-TURN gives you horsepower, rigidity and production you would normally expect to find in lathes costing twice as much. We can prove more production per lathe dollar . . . more production per operator hour!

*Find out how the HI-TURN Lathe fits your turning requirements.*

WRITE: LODGE & SHIPLEY, 3058 COLERAINE AVE., CINCINNATI 25, OHIO



*your LODGE-ical choice!*

**Lodge & Shipley**

**81. Live Centers**

George Scherr Co., Inc., 200-MM Lafayette St., New York 12, N. Y. Precision frictionless live centers with ball and roller bearings. Suitable for mounting parts without centre bore, supplied with uniform tapered head to accommodate adapter sockets.

**82. Self Cleaning Collet**

Sheffer Collet Co., Traverse City, Mich. A 24-page catalog giving dimensions on the company's complete line of standard collets, pushers, pads and accessories.

**83. Tumbling Abrasive**

Simonds Abrasive Co., Tacony and Fraley Sts., Philadelphia 37, Pa. Borolon Tumbling Abrasive for barrel finishing is aluminum oxide abrasive in chips and screened grain sizes for a wide range of use. New sizing standards for chips provide more sizes than previously available and more accurately controlled.

**84. Grinding Wheels**

Simonds Worden White Co., Sales Promotion Dept., 1101 Negley Place, Dayton 7, Ohio. A specification table lists thickness and bore of each of the Dayton Safety Grinding Wheels in stock. Standard diameters range from 12 to 36 inches. In addition, a tabular breakdown of the separate variables making up the standard grinding wheel specification and identification code numbers.

**85. Lathe**

South Bend Lathe Works, South Bend 22, Ind. 16 inch precision toolroom lathe has headstock for heavy duty, crossribbed construction, extra long hand scraped bearings fitted to bed ways and a heat treated, superfinished spindle.

**86. Steel Equipment**

Standard Pressed Steel Co., Box 556, Jenkintown, Pa. 8-page catalog illustrating work benches, tool stands, shelving and other Hallows pressed-steel shop equipment for shop, laboratory and assembly line use. Also included are multiple unit benches, cabinet benches, standard open-type Hallows work benches, and heavy-duty portable benches.

**87. Woodruff Keyseat Cutters**

Supreme Keyseat Cutters Co., 1328 - 43rd St., Kenosha, Wis. Special cutters are made to sketch or blue-print. All standard sizes in stock in both the staggered and straight tooth.

**88. Threading Tool**

Warner Development Co., South Beloit, Ill. Current data on Spee-D-Thred — single point threading tool for reversing lathes.

**89. Tracer Milling Machine**

Sundstrand Machine Tool Co., 2539 Eleventh St., Rockford, Ill. Horizontal, vertical, and cross feed are controlled simultaneously on the Sundstrand Vertical Tracer Rigidmil by means of the 3-dimensional tracing valve.

**90. Magnetic Disc Brake**

Stearns Electric Corp., 120 N. Broadway, Milwaukee 2, Wis. The "UH" 70 Series Magnetic Disc Brake (-9) is suitable for motor mounting on re-rated frame sizes 213 through 256U (alternating current).

**91. Torque Wrench Adapters**

P. A. Sturtevant Co., Addison, Ill. Bulletin describing sensory torque wrench, basic multi-purpose adapter arm, adapter drive end accessories and the dual range multi-purpose torque wrench and adapter.

**92. Hardness Testers**

The Torsion Balance Co., Clifton, N. J. Bulletin describing the four Kentrall Combination Hardness Testers, both make regular and superficial Rockwell Tests and costs about the same as single-function testers.

**93. Scale**

Trico Machine Products Corp., 2664 Grand Ave., Cleveland, Ohio. Micro-Scale for setting dividers, trammels, or compasses for any radius or size within the range of the tool in increments of 0.001 inch.

**94. Boring and Facing Machine**

Tru-Bor, Inc., Wyandotte Rd., Willow Grove, Pa. Tru-Bor boring and facing machine has finger tip instant automatic control. The spindle is assembled with strict, cleaned atmosphere, dust-free control. It is designed for regular and carbide tools.

**95. Lift Truck**

The Yale and Towne Manufacturing Co., Dept. A-1285, Philadelphia 15, Pa. G-3 Series of 15,000 to 20,000 pound capacity industrial lift trucks with wide angle vision.

**96. Cutting Tools**

The Warner and Swasey Co., Cleveland 3, Ohio. "Practical Cutting Tool Research."

**97. Mist Coolant System**

Wesco Tool and Manufacturing, 2820 San Fernando Blvd., Burbank, Calif. Mist coolant system has individual control for both air and liquid, flexible steel mist nozzle and adjustable magnetic holder.



U. S. NAVY PHOTO

## Trouble Spotter...

This majestic cruiser is a U. S. Navy airship. Its mission is locating trouble—*ahead of time*. How effective its deadly purpose in convoy is attested by the fact that "no vessel escorted by a blimp in World War II was sunk by an enemy submarine." Its invaluable contribution to our Aircraft Early Warning system is also firmly established. It is a Navy "tool" that virtually eliminates surprise.

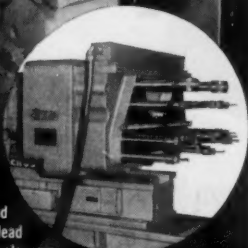
The U. S. Drill Head Co.'s new electronic device seeks trouble too—in automated production lines. It locates faulty machining during a "transfer setup" and stops the machine *before* succeeding operations are begun. It minimizes the chance of costly smash-ups and resulting expensive down-time . . . reduces re-operating and scrap-loss costs.

This development is another precision cost-reducing "tool" from the largest exclusive drill head builder in the world.

We manufacture all types of adjustable, fixed center and individual lead screw tapping heads. Ask us to help solve your multiple drilling and tapping problems.

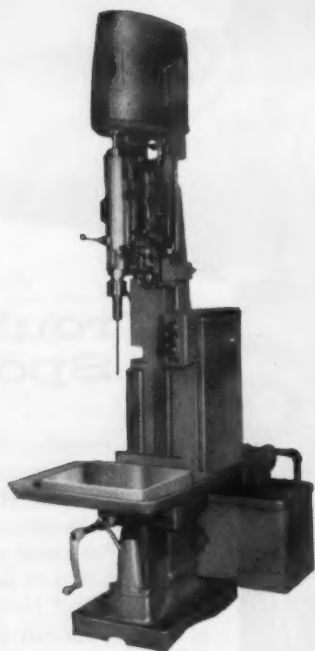
### US Individual Lead Screw Tapping Head

automatically signals on a light panel exact location of any spindle not tapping to full depth, and stops the entire line. In addition, patented US Safety Tap Spindles prevent all tap breakage due to dull taps or improperly drilled holes. Installed on transfer machines, this exclusive US development provides dual automatic protection during tapping without need for an extra probing station.

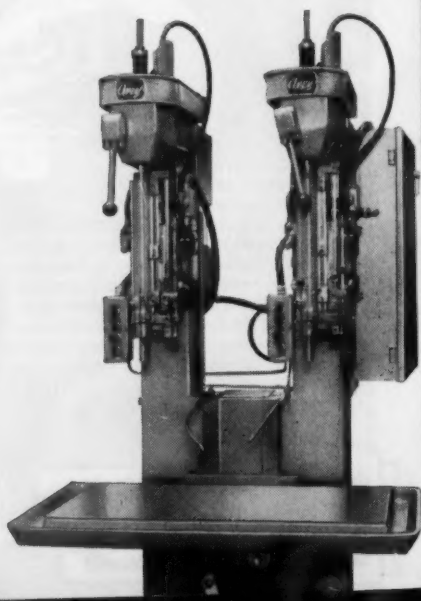


UNITED STATES DRILL HEAD CO.

BURNS STREET • CINCINNATI 4, OHIO  
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**Here's automatic push-button**





Your drilling operations become fast, automatic, and simple when you have Avey-draulics in your shop. Almost immediately, you increase your productivity per man-hour.

The reasons are clear when you see these Avey-draulic features: (1) push-button control; (2) automatic cycle—rapid traverse, feed, and rapid return; (3) jump feed attachment available; (4) multi speeds; (5) variable hydraulic feeds; (6) 2" to 12" stroke; (7) 1 or 2 horsepower; (8) single or multiple spindle.

For automatic deep hole drilling, specify Avey's exclusive Torque-matic control. This automatically withdraws the drill for chip clearance—only when necessary—during your drilling operation.

Write for Bulletin 252.

Avey Division, The Motch & Merryweather Machinery Co., Box 625 Cincinnati 1, Ohio.

on **drilling**



**THE MOTCH & MERRYWEATHER MACHINERY CO.**

## Acquisitions and expansions . . . awards . . . meetings . . . new appointments.

Edited by R. M. SCHIFFER

### SENTRY'S OFFICE ADDITION NEARS COMPLETION

Sentry Co., Foxboro, Mass., manufacturer of electric furnaces, expects to occupy its new office building adjoining the main plant, before the year's end. Styled in traditional Colonial design, the new structure is planned to accord with the prevailing architectural motif of the area. The new building is of one story construction, with basement and separate heating plant. Plans provide for a general office, private offices, drafting room and various other facilities.

Decision to expand its quarters was enforced this year by the need for additional space in the main plant. By housing its offices in a separate building, the company will make considerable space available for expansion of factory facilities.

★ ★ ★

### NEW PROTECTION FOR DEMON BLADES

The DoAll Co., Des Plaines, Ill., recently announced a new protective plastic covering for the high perform-



Wash drawing showing Sentry's new office addition in Foxboro, Massachusetts

ance Demon High-Speed Steel Saw Blade. Saw-Cap, as the covering is known, affords protection for the precision cutting and is said to assure the sharpness and accuracy of each blade when it reaches the customer.

Saw-Cap is applied to all gages and widths of the Demon blade during the final stages of manufacture, thus protecting the teeth during welding, coiling and packaging. Complete protection during shipment is assured since teeth cannot contact each other or sides of the band. The new plastic covering minimizes chances of injury to the saw operator when uncoiling the saw band for use and can easily be re-applied when the band is removed from the machine for storage.

★ ★ ★

#### MACHINE DESIGN AWARDS

First Award of \$5,000 was given to Tom Learmont, product engineer from Bucyrus Erie Company, Milwaukee, Wisconsin, from The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, in a national competition sponsored by the Foundation for the

design of machines improved through the use of arc welding. Mr. Learmont's winning design was for the welded steel base of a 55 cubic yard power shovel weighing 452,000 pounds. Welding saved 22 percent in weight, 15 percent on material costs with a net manufacturing savings of 24 percent. The cost of stripping coal with the shovel is said to be reduced an estimated 20 percent.

A total of 26 awards were made to

## ONLY NEW HALLOWELL ERECTOMATIC STEEL SHELVING

has the unique built-in locking device which cuts assembly time, speeds repositioning of shelves



### PLUS THESE FEATURES

Straight-in, straight-out shelf change  
Independent shelf positioning  
Full use of shelf area  
Common side panels and posts  
Beaded posts and flanged shelves  
Full-depth shelf supports  
4 classes of shelves

The unique built-in locking device,\* developed by SPS for its new ERECTOMATIC® steel shelving, speeds assembly and rearrangement of shelves. To position a shelf—just slide it into place, press the locks, and the shelf is locked. To reposition a shelf—release the locks, pull the shelf straight out, slide it straight in at its new location, and press the locks. It takes only seconds to do the complete job. And shelves below and above, to left or right are undisturbed. For complete information, see your local Hollowell distributor. Or write Hollowell Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pennsylvania.

\*Patent applied for

STANDARD PRESSED STEEL CO.

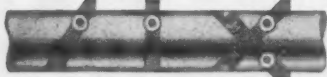


SHOP EQUIPMENT DIVISION



JENKINTOWN PENNSYLVANIA

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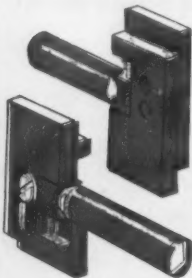
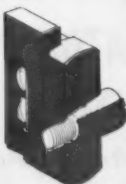
## A BETTER BORING BAR

because our method of broaching square holes makes a better fit for the tool bit. This means more rigidity and longer life, especially with tungsten carbide.

Square hole sizes range from  $\frac{1}{8}$ " up to and including  $\frac{3}{4}$ ".

### TYPE "B" & "C" CUTTERS

A strong rigid serrated 2-bladed cutter-located in the bar with a taper pin. Bore holes accurately to close limits. Can be expanded and reground giving long life. Sizes  $\frac{7}{8}$ " dia. up to 6".



A simple 2-bladed reaming cutter. Can be expanded and reground. Located in the bar by a hardened V. This V never has to be reground as blades are expanded. Fits other bars with slots

$\frac{3}{8}$ " x  $\frac{7}{8}$ "       $\frac{1}{2}$ " x  $1\frac{1}{4}$ "  
 $\frac{1}{2}$ " x 1"       $\frac{3}{4}$ " x  $1\frac{1}{2}$ "

### THE DETROIT BORING BAR CO.

688 E. FORT ST.

DETROIT 26, MICH.

Established



1927

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180 modern machine shop

## news of the industry . . .

engineers in companies manufacturing machinery, jigs and tools for various processing type industries. The competition was one in a series sponsored by the Foundation to help advance the progress of welded machine design.

George Volin, design engineer for the E. D. Jones and Sons Company, Pittsfield, Massachusetts, received the \$4,000 Second Award for the design of a new type of paper pulp refining machine. The \$3,300 Third Award went to Leighton W. Johnson, chief engineer for Gunderson Brothers Engineering Corporation, Portland, Oregon, for the design of a portable gang saw used in the lumber industry. A total of \$25,000 was awarded to engineers from 13 different states, employed in a wide variety of industries.

★ ★ ★

### BUHR MACHINE TOOL PURCHASES SIDNEY MACHINE TOOL COMPANY

Joseph H. Buhr, president of Buhr Machine Tool Co., Ann Arbor, Mich., announced recently the purchase of The Sidney Machine Tool Co., Sidney, Ohio, manufacturers of heavy duty precision metalworking lathes.



William R. Gerchow (left) and Joseph H. Buhr

December, 1957



Courtesy: Central Scientific Co., Chicago, Ill.

## Switch to Mattison surface grinder doubles output ... consistent accuracy speeds assembly

Not only is output doubled, but improved accuracy being achieved on this Mattison high-powered precision surface grinder enables rotors for high vacuum pumps to be assembled more rapidly. Production now is 50 parts per hour compared to 12 to 25 per hour with former grinding method.

Stock removal on this job is .0015 inch with a high degree of accuracy required. Both parallelism and flatness are held to .0003 inch to assure consistent pump performance at very low pressures.

Greater accuracies also are being realized in machining a wide variety of other scientific apparatus parts. Very thin vanes for another vacuum pump, previously ground one at a time, are now ground in production lots. Reproduceability is greatly improved.

Like every Mattison grinder, this horizontal spindle unit features high horsepower and rigid construction—the design combination that means ability to handle a wide range of work with unmatched accuracy at high production rates.



High-Powered Precision  
Surface Grinders  
**MATTISON MACHINE WORKS**  
Reckford, Illinois, U. S. A.



For more data circle 421 on Postpaid Card

**news of the industry . . .**

The Sidney Machine Tool Company will be operated as a wholly-owned subsidiary. It will continue to be engaged exclusively in the manufacture of Sidney Lathes and coil-winders. The present nationwide sales organization will be continued. Administrative officers of the company will be Joseph H. Buhr, as president, and W. R. Gerchow, as executive vice president and general manager. Both Mr. Gerchow and Mr. Buhr will keep their headquarters at the Buhr plant in Ann Arbor. Mr. Gerchow will continue his responsibilities as executive vice president and general manager of Buhr Machine Tool Company.

The Sidney Machine Tool Company is a 53 year old concern, originally founded for manufacturing wood-

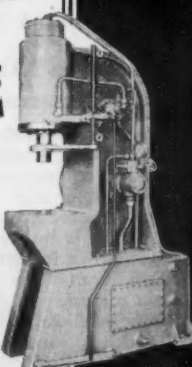

working machinery in 1904, it brought out its first metalworking lathe in 1914. By 1937, almost all manufacturing was devoted exclusively to Sidney Metalworking Lathes. In 1947, a Sidney lathe was said to be the first to have more than 30 speeds, as well as being designed for carbide use, also in 1950, the Sidney Fluid Tracer was introduced. The company manufactures a complete line of precision toolroom and engine lathes, also heavy-duty coil winders.

★ ★ ★

**NEW TOOL DISTRIBUTING FIRM**

To supply the needs of the fast growing metal industries in the Southeast, Southern Tool Distributing Company has in its Atlanta, Georgia, warehouse an unusually complete stock of metal cutting tools, precision

★ ★ ★ ★ ★



# Greenerd

## PRESSES

### ARBOR & HYDRAULIC

for . . .

- ASSEMBLING
- BROACHING
- FORMING
- STRAIGHTENING

Rack and Pinion Arbor Presses.  
Hydraulic presses made to conform to J.I.C. standards. Pictured at right is 15-ton hydraulic press.

LISTED IN SWEET'S MACHINE TOOL CAT.  
OR WRITE TODAY FOR CATALOG #554.

# Greenerd

## ARBOR PRESS CO.

41 CROWN ST. NASHUA, N.H.



OA

9" column 3'-4' arms

1A

9"-11" column 3'-4'-5' arms

3A

13"-15"-17" column 4'-5'-6'-7' arms

4A

19" column 6'-7'-8' arms

5A

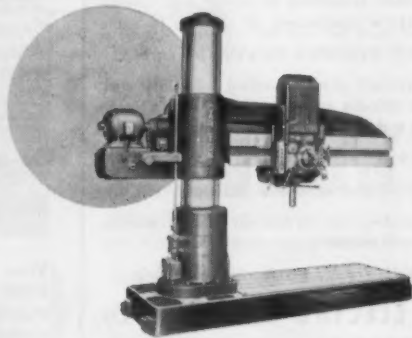
22"-26" column 7' to 12' arms

# Carlton

*specialists in  
radial drills*

Carlton has specialized in radial drill research, engineering and manufacturing since 1916. Our close contact with—and intimate knowledge of industry's drilling requirements—have produced a wide line of the most modern and up to date radial drills. Made in arm lengths from 3-ft. to 12-ft., column diameters from 9" to 26". Programming, pre-select and manual speed-feed controls, plus special bases, tables, and jigs available for additional productivity. For further information, send today for free descriptive bulletins.

The Carlton Machine Tool Co., Cincinnati 25, Ohio.



For more data circle 423 on Postpaid Card

December, 1957

modern machine shop 183

# **PRECISION DRILLING MACHINE**

**5/8"  
CAPACITY**

•  
**Designed  
for  
Those Jobs  
Where  
Accuracy  
Is  
Important.**



## **FEATURES—**

- Precision ball bearing spindle with minimum run out
- Accurate mounting of head and column to insure squareness of spindle to table
- Built-in gear drive for extra low speeds
- Convenient direct reading infinitely variable spindle speed control dial, together with a drill size, speed and material chart
- Quick-set vernier depth control
- Heavy construction to maintain accuracy
- Available in bench or floor models. (Bench model illustrated)

Write for More Descriptive Bulletin

**The ELECTRO-MECHANO Co.**

265 East Erie Street • Milwaukee 2, Wis.

For more data circle 424 on Postpaid Card

184 modern machine shop

news of the industry . . .

tools and die maker's supplies. This new company is headed by R. L. Hill and is housed in a modern building which is designed to adapt itself to the ease of handling customer's orders for quick delivery.

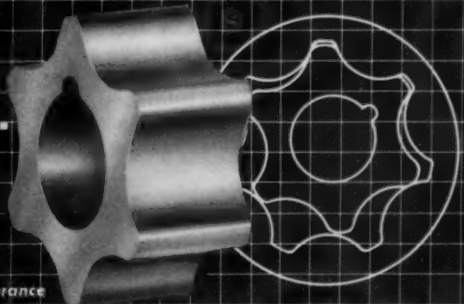
Manufacturers represented on a stocking basis are: Atkins Saw Division, Bay State Tap and Die Company, Brown and Sharpe Manufacturing Company, Carboloy Company, Cleveland Cap Screw Company, Crucible Steel Company, Lufkin Rule Company, Nicholson File Company, Norton Company, Producto Machine Company, Taft-Peirce Manufacturing Company and the Whitman and Barnes Company.



View showing (left to back to right) LaMar Cobb, district manager with Whitman and Barnes, Harry Jason, district manager with Carboloy, Charles Harrop, district manager with Brown and Sharpe, and Norm Ekholm, district manager with Norton Co.

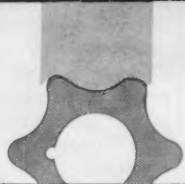
December, 1957

## hoglund contour dressing...



Six faces ground to .0002" tolerance  
and 9 microinch finish.

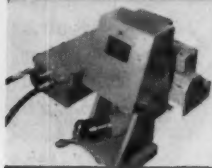
*Closer tolerances in pump assembly  
increase rotor life and efficiency,  
improve slippage characteristics.*



13 stacked impellers are  
automatically indexed and  
the form ground in 6 separate  
positions.



After each impeller stack is  
ground, wheel is dressed at  
uniform peripheral speed with  
diamond normal to surface.



Hoglund Model 38A Dresser  
features computed master  
contour template, 16 to 1  
inclined plane cam reduction,  
diamond cooling during  
dressing.

## boosts impeller grinding rates — improves pump performance

This impeller is typical of the countless form grinding applications where the accuracy initiated by Hoglund Contour Dressers enables both product and production improvement.

A Hoglund Model 38A Dresser, installed on a 12x40 surface grinder helped boost production 40%, improved tolerances, and lowered surface finish from 20 to 9 microinches. Combined high accuracy and high production are assured because: a) all Hoglund templates and ratio cams are individually computed to the job; b) only with the simplicity and ingenuity of inclined planes can you sustain accuracy and automaticity.

Over 120 different types of Hoglund Contour Wheel Dressers are now in service — enabling "tenth tolerance" contouring of intricate forms heretofore impossible to grind. They're adaptable to all types of grinders.

If you are grinding simple or intricate forms, you will want the whole Hoglund story in Hoglund's new technical brochure. Let Hoglund engineers recommend a suitable solution to your problem.

# HOGLUND

ENGINEERING & MANUFACTURING CO., INC.

349 Snyder Avenue • Berkeley 18, N. J.

Send for brochure  
on solutions to  
tough profil-  
ing problems.

Name \_\_\_\_\_ Title \_\_\_\_\_

Co. \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

For more data circle 425 on Postpaid Card

December, 1957

modern machine shop 185

news of the industry . . .

A feature of Southern Tool's system of most interest to customers is the highly mechanized inventory control system which gives finger tip information as to quantity in stock, price, rapidity of movement and restocking needs.

Southern Tool is supported by four outside salesmen whose combined ex-

perience total 57 years and two inside salesmen whose experience total 23 years.

★ ★ ★

### SPS MAKES PLANS FOR THREAD METROLOGY LABS

Plans for a coast-to-coast network of screw-thread measuring laboratories to help industry with fastener fit and gaging problems have been

announced by Standard Pressed Steel Co., Jenkintown, Pa. This service for industry will come into being early in 1958 when SPS, producer of precision industrial and aircraft fasteners, opens three identical screw thread metrology labs at company plants in Jenkintown, Cleveland and Los Angeles.

It is said that primary goals will be to help industry meet increasing demands for mechanical precision in the nuclear and missiles age and to reduce production losses resulting from "needless" fastener assembly problems. The basic services of the metrology labs will be the analysis of fastener fit problems; the checking

## NEW AND FREE

Full of facts on  
every "Right Combination" you need in  
**Reinforced Grinding Wheels**



Here's the whole story on Norton reinforced wheels — a complete line for everyday grinding jobs. Tells how each of the many types of wheels combines exactly the right abrasive, reinforcing web and bond to assure strength and safety — plus fast, cool, trouble-free grinding. Catalog No. 1748 also describes reinforced mounted wheels and sticks. Ask your distributor for it. Or write to NORTON COMPANY, General Offices, Worcester 6, Massachusetts.

W-1812



*Making better products . . .  
to make your products better*

**NORTON PRODUCTS** Abrasives • Grinding Wheels • Grinding Machines • Retractors  
BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Behr-cat Tapes  
For more data circle 426 on Postpaid Card



# BUTTERFIELD

## Special Purpose Taps

Ideal performers in metals like stainless steel, cast iron, brass, aluminum, magnesium... with different cutting angles and surface treatments... at standard prices from stock.

**100% COMPLETE LINE... EVERY TOOL 100% INSPECTED... AND YOU GET  
100% SERVICE FROM YOUR BUTTERFIELD DISTRIBUTOR**

Butterfield also offers a complete line of taps, dies, drills, reamers, cutters, end mills, hobs and carbide cutting tools. There are Butterfield warehouses in Chicago, Cleveland, Detroit, Fort Worth, Los Angeles, New York, San Francisco. **BUTTERFIELD DIVISION • Union Twist Drill Company • Derby Line, Vermont.**

**For more data circle 427 on Postpaid Card**

and setting of screw-thread inspection gages with highly accurate equipment; and the setting up of reliable inspection gaging systems in conformance with recognized thread standards.

Each facility will make available to fastener users the advanced techniques and equipment for screw-thread gaging and size control and will serve

also as a clearing house for the latest information on threaded fasteners.

It is said that the temperature and humidity controlled labs will cost an estimated \$300,000 — most of it for gages and measuring apparatus. Each lab will have complete equipment for precision measurement of all screw thread elements — diameters, angles, lead, radii and others; for gage settings; and for the inspecting of the thread-forming tools. Equipment will

include precision machines for direct measurement of thread dimensions to the nearest one hundred-thousandth (0.00001) of an inch; primary reference standards, of even greater precision, for calibrating the machines; optical comparators for studying screw-thread details enlarged 100 times on viewing screens; and profilometers that measure surface smoothness to close as one millionth of an inch.

The SPS Screw Thread Metrology Laboratory at Jenkintown will be in the company's headquarters plant. The midwest unit will be in the new plant of The Cleveland Cap Screw Co., a wholly-owned SPS subsidiary pro-



MODERN  
FEDERAL  
DIAL  
FEEDS  
have what  
it takes!

**VERSATILITY**  
plus  
**AUTOMATION**

No. 7 Dial Feed  
Capacity, 80 tons

What's the job? A standard operation—or one that's unique to your plant? Modernize with Federal Dial Feeds and watch production go up, costs go down. Eliminate need for expensive equipment. Finest materials and workmanship. 6 to 80 tons. Automatic feeds and ejectors if desired.

Write for new Dial Feed Catalog

**THE FEDERAL PRESS COMPANY**  
704 Division Street, Elkhart, Indiana

## FEDERAL DIAL FEED PRESSES

32 Years' Experience in Dial Feed Engineering and Construction

For more data circle 428 on Postpaid Card



For fast, economical cutting of flat metal shapes there are

# 7 MODELS OF Campbell Nibbling Machines

...with cutting capacities ranging from 3/32" mild steel for MODEL 0 machine to 1/2" mild steel for MODEL 530, in sheet sizes from 16" or less, to 72".

CAMPBELL NIBBLERS are making tremendous savings in time and money for hundreds of users in aircraft and other metal-working plants.

...in fast cutting of ferrous and non-ferrous sheet metals or composition sheets.

...for moderate production runs or experimental development work.



Economical "throw-away" punch and die



Send for this catalog for complete information on this versatile production and experimental tool

• CAMPBELL NIBBLERS cut from 40 to 60 times faster than drilling or filing. A fast-moving punch (350 to 900 strokes per minute) operating over a die, nibbles out the design, taking a small "bite" with each stroke of the punch.

...for any and all kinds of shapes

...for either inside or outside cuts

...with no distortion of material—no internal strains—no invisible fractures—no burr

...with a "nibbled" edge that is sufficiently smooth to require very little finishing and sometimes none

CAMPBELL standard punches are made double end to double work life and halve the cost. Prices are so low (starting at 40c each, or 20c per working end) that new punches cost less than regrounding dull ones.

Here is a quick picture of CAMPBELL NIBBLING MACHINE Capacities

Campbell Nibbler Model#	Sheet Width	WORKING CAPACITY		Strokes per Minute
		Sheet Thickness		
		Mild Steel	Alloy Steel	
0.....	16"	3/32"	1/16"	900
1A.....	20"	3/16"	1/8"	375-650
430.....	60"	3/8"	1/4"	350-525
436.....	72"	3/8"	1/4"	350-525
530.....	60"	1/2"	5/16"	350-525
2524.....	48"	1/4"	3/16"	375-650
2536.....	72"	1/4"	3/16"	375-650

## Campbell Machine Division AMERICAN CHAIN & CABLE

931 Connecticut Avenue, Bridgeport 2, Connecticut

For more data circle 429 on Postpaid Card



ducing industrial fasteners. The West Coast metrology lab will be at the Los Angeles plant of Cooper Precision Products, aircraft fastener producing subsidiary of the company. The three metrology labs will form a separate branch of SPS Laboratories — the overall research, testing and control wing of the company. SPS Laboratories, headquartered in Jenkintown, functions as a company-wide bureau of standards.

★ ★ ★

#### DETROIT STAMPING PLAYS HOST TO INDUSTRIALISTS

A group of German and Austrian industrialists on a nationwide tour of leading metal shaping plants through-



Glendon H. Roberts, president, (right) explains progressive die drawings to three German-Austrian industrialists

out the United States paid a visit to the Detroit Stamping Company's plant in Detroit, Mich. During the tour, which was under the personal guidance of Glendon H. Roberts, pres-

★ ★ ★ ★ ★

### cut weld cleaning time by 85%

Throw away your cold chisel and whisk off weld spatter with a dry rag! Protect-O-Metal spatter-proofing compounds make weld cleaning a breeze. Improve your welds at the same time . . . P-O-M compounds quiet the arc, improve fusion and electrode operation, prevent oxidation and annealing scale, cause no porosity. No smoke odors, or fumes.

**P-O-M No. 2.** Non-inflammable, non-toxic water-soluble paste. Inorganic. Thin before applying and start welding at once. \$3.40 per gallon, f.o.b. Dayton.

**P-O-M No. 8.** Rust- and corrosion-resistant resin base compound. Comes ready to use. Safe for all metals. Good paint primer; permits outdoor storage of subassemblies. \$3.45 per gallon, f.o.b. Dayton.

#### PROTECT-O-METAL

G. W. SMITH & SONS, INC.

1700 SPAULDING RD., DAYTON 3, OHIO

For more data circle 430 on Postpaid Card



#### MONEY-BACK TRIAL OFFER

Order a trial gallon of each today for testing in your shop. We'll cancel the bill if you're not satisfied.

WILSON "ROCKWELL"—  
THE WORLD'S STANDARD OF HARDNESS TESTING ACCURACY

WILSON "ROCKWELL"

HARDNESS TESTERS



A FULL WILSON LINE  
TO MEET EVERY  
HARDNESS TESTING  
REQUIREMENT

FULLY  
AUTOMATIC  
•  
SEMI-AUTOMATIC  
•  
REGULAR  
•  
SPECIAL  
•  
SUPERFICIAL  
•  
MICRO & MACRO  
HARDNESS TESTERS

## When it's WILSON "ROCKWELL"-TESTED you KNOW it's RIGHT!

*Easy to operate*—all controls at hand. Takes rough service—maintains accuracy after years of operation.

*Expert Wilson Service*—helps you choose proper model...keeps it at work. A staff of WILSON hardness testing experts is available to provide quick emergency service if it is ever needed.

*The booklets listed below give complete and helpful data on the indicated WILSON equipment...*

DH-325 for "Rockwell" Regular

DH-326 for "Rockwell" Superficial

DH-327 for Accessories & Specials

ACCO



# WILSON

MECHANICAL INSTRUMENT DIVISION  
AMERICAN CHAIN & CABLE

230-G Park Avenue, New York 17, N.Y.

For more data circle 431 on Postpaid Card

Write for  
one or all  
of these  
booklets

DH-325

DH-326

DH-327



## news of the industry . . .

ident of Detroit Stamping, the delegation showed particular interest in the progressive stamping samples and drawings, certain heavy presses doing in-line production of multiple operation stampings, multi-slide machines engaged in producing high volume intricate form stampings and the light

### ABRASIVE CENT-R-LAP TOOL



Saves time, eliminates diamond dressing. Cones changed in seconds. Available in three sizes:  $\frac{3}{8}$ " ,  $\frac{3}{4}$ " and  $1\frac{1}{2}$ " Cent-R-Laps and abrasive cones in leading grits. Write for descriptive literature and prices. Sold to consumers only.

J. R. REICH MANUFACTURING CO.

201 E. Stroop Rd.

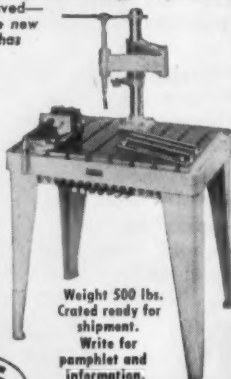
Dayton 9, Ohio

For more data circle 432 on Postpaid Card

### Try this Allman Universal Hand Tapper FREE for 15 days—

Results have proved that once this tapper is in your shop or tool-room and you find 70% of your free hand tapping time saved—it will stay there! The new Allman hand tapper has these advantages:

- Articulate arm swings clear of large table for placement of work.
- Limitless number and sizes of tapped holes without moving work piece.
- Vise holds work as small as  $\frac{1}{8}$ " square.
- Floating tap locates itself in hole.
- Individual spindle holds taps, thus change requires only seconds.



Weight 500 lbs.  
Crated ready for shipment.  
Write for pamphlet and information.

**TOOLS, INC.**

1734 No. 25th Ave. • Melrose Park, Ill.

For more data circle 433 on Postpaid Card

192 modern machine shop

precision high-speed presses working on fabrication of Swedish high-carbon steel parts. Of special interest also was the tool and die department.

★ ★ ★

### BROWN AND SHARPE TO MARKET LIPE AML BAR FEED

Brown and Sharpe Manufacturing Co., Providence, R. I., has announced an agreement with Lipe-Rollway Corp., Syracuse, N. Y., to sell the latter's Automatic Magazine Loading Bar Feed for installation on Brown and Sharpe Single-Spindle Automatic and Hand Screw Machines. The agreement permits B and S to install, service and maintain the Lipe Bar Feed together with the above screw machines anywhere in the United States and Canada.

The AML Bar Feed holds up to eight hours supply of bars, rods or tubing, loading and feeding the stock automatically to a predetermined stop. The unit is pneumatically controlled, eliminates feed fingers and manual loading, reduces operator fatigue and holds tolerances of plus or minus 0.001 inch. The Lipe AML Bar Feed will be sold through Lipe's distributors.

★ ★ ★

### DAKE COMPLETES NEW PLANT

The Dake Corp., Grand Haven, Mich., recently held "open house" in



**DEMAGNETISERS**  
SINGLE AND DOUBLE UNITS



are invaluable when tools or equipment become magnetised  
Power consumption is only 60 watts.

ELISHA PENNIMAN Elmwood 10, Connecticut.

For more data circle 434 on Postpaid Card

December, 1957

# Jarvis Adjustable Pitch LEAD SCREW TAPPER



**NEW!**

...a-cost cutting

**OPPORTUNITY** you  
can't afford to miss!

One tapper . . . one lead  
screw . . . convertible  
in **SECONDS** to  
tap different pitches!

**ANOTHER**

**Jarvis**

**FIRST!**

**send this  
coupon  
TODAY!**

Jarvis Corporation

Middletown, Connecticut

Yes! I am interested in this new, Jarvis First—  
the Adjustable Pitch Lead Screw Tapper.

- ☐ Send details and prices  
☐ Have a Jarvis representative call  
☐ We would like a demonstration in our plant

NAME.....TITLE.....

COMPANY.....

ADDRESS.....

For more data circle 435 on Postpaid Card

December, 1957

modern machine shop 193



Illustration showing Dake Corporation's new plant located in Grand Haven, Michigan

celebration of the completion of its new plant at 724 Robbins Road, Grand Haven Township.

The new structure was completed in August of this year at a cost of approximately \$500,000. Company officials state that the building, which is

290 feet long and 180 feet wide, includes three bays. The central bay is 42 feet high and the other two are 22 feet high, thereby giving ample clearance for moving materials with cranes. There is 45,000 square feet of shop space and 5,600 feet of office space.

★ ★ ★ ★ ★

## Adjustable MULTI-DRILL for Production Drilling

9" DRILLING AREA  
AVAILABLE WITH 2 TO 8 SPINDLES

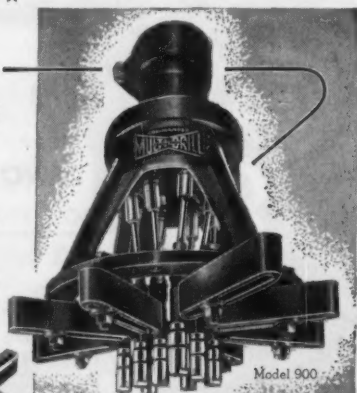
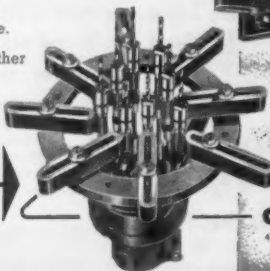
- Designed for accurate, high speed production drilling
- RUGGED CONSTRUCTION
- Quick, easy adjustments to **any** hole pattern on or within a 9" circle;  $\frac{1}{2}$ " minimum center distances; Drill sizes  $\frac{1}{16}$ " to  $\frac{3}{8}$ "
- Special adaptations available.

MULTI-DRILLS are made in other sizes and models.

Write for details and name of your nearest Distributor.

Locator arms are designed for fast, easy adjustment

Dependable Performance...  
proven by industry



**FITS ANY  
DRILL PRESS**

**COMMANDER MFG. CO.**

4224 W. KIMZIE STREET, CHICAGO 24, ILLINOIS

For more data circle 436 on Postpaid Card





General view showing the new factory for Keo Cutters, Inc., in Warren, Michigan

The new building is situated on a 10-acre site immediately south of the city of Grand Haven.

The increased space provided by the half million dollar structure is being used for expanding production on the standard line of Dake hydraulic, utility and arbor presses, and the line of custom engineered presses.

★ ★ ★

### KEO CUTTERS CONSTRUCTS NEW FACTORY

The construction of a new factory building has been announced by Keo

Cutters, Inc., 25040 Easy Street, Warren, Michigan. The firm was previously located at 19326 Woodward Avenue, Detroit, Michigan.

The new building provides increased space for the manufacture of Woodruff keyseat cutters, lathe mandrels, center drills and center reamers—both standard and special.

Chris Kuntz, president of the company, states that the new factory facilities will enable Keo Cutters, Inc., to increase its production facilities and give immediate delivery from stock on standard items.



## DYKEM STEEL BLUE

### Stops Losses

making Dies and  
Templates

Popular package  
8-oz. can fitted  
with Bakelite cap  
holding soft-hair  
brush for applying right  
at bench; metal surface  
ready for layout in a few min-  
utes. The dark blue background  
makes the scribed lines show up in  
sharp relief, prevents metal glare.  
Increases efficiency and accuracy.

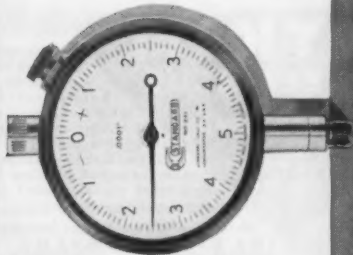
Write for sample on company letterhead  
**THE DYKEM COMPANY**  
2301F North 11th St. • St. Louis 6, Mo.

With DYKEM Steel Blue

Without DYKEM Steel Blue

For more data circle 437 on Postpaid Card

INDICATORS  
Proven  
Lowest In-Use Cost



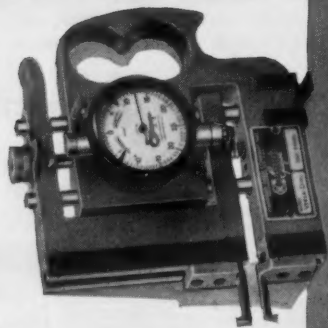
DuBo®  
Cuts Plug Gage Costs  
60%



DIAL SNAP GAGE  
Parallel Anvils  
Assured by Paralloc®



VERSA-DIAL®  
Eliminates  
Most  
Special  
Gages



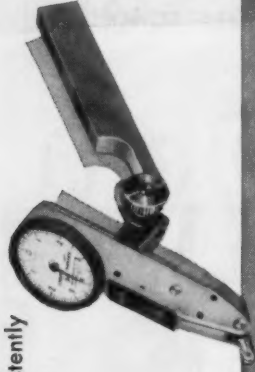
DIAL BORE GAGE

CHECK MASTER®

DIAL BORE GAGE  
20 Year Use Proves  
Rugged Accuracy



CHECK MASTER®  
Super Sensitive —  
Repeats Consistently



## Look for the PLUS VALUES Behind Every Gage by STANDARD

Over and above the normal requirements of fine gages, STANDARD brings you *extra values* that mean lower in-use cost. Ask the *Man-from-Standard* to show you his new, do-it-yourself gage test kit.



® SINCE 1925

**GAGE COMPANY, INC.**  
POUGHKEEPSIE, N.Y.

**A COMPLETE LINE OF GAGES . . . INDICATING, FIXED AND ADJUSTABLE TYPES**

For more data circle 439 on Postpaid Card



Shown in the above illustration are the men who attended the conference: (left to right) front row, C. A. Bassett, general sales manager; D. R. Starrett, executive vice president; A. H. Starrett, president; D. Findlay, treasurer; C. O. Newton, vice president in charge

of sales; back row, C. G. Nordmark, advertising and sales promotion manager; R. M. Peckham, Southern sales manager; J. E. Holcomb, Pacific Coast sales manager; G. E. Gilbert, Eastern sales manager; W. W. Haskins, Western sales manager

### THE L. S. STARRETT COMPANY HOLDS SALES CONFERENCE

The 1957 regional managers sales conference of The L. S. Starrett Company was held recently at the Starrett plant in Athol, Mass., during the

week of October 7-11. Management, sales and advertising men participating in the conference are shown in the accompanying illustration. The entire week was devoted exclusively to round table conferences on sales, advertising, production and so on.



***You Need an Extra Hand Now  
to Speed Up Production!***

**HEIMANN TRANSFER SCREW SETS**

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

IN 11 SIZES—No. 6 to 1"  
N.C. in all S.A.E. sizes.

**HEIMANN MFG., CO. • URBANA, OHIO**

For more data circle 440 on Postpaid Card

# TO MEET AND BEAT HIGH PRODUCTION COSTS

compare the blades you're using  
with **STAR**

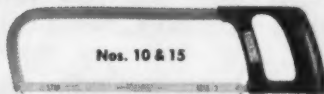
## THE STAR BLADES GIVE ALL 5

1. Uniformity in fabrication
2. Proper Hardness
3. Efficient Tooth Design
4. Sufficient Set for Clearance
5. Clearly marked for Ease of Identification

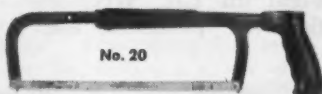


## Point 2 OF STAR'S 5 FEATURE CHECKLIST PROPER HARDNESS

To insure full blade life and economical performance our company has developed over many years unique heat treating equipment that insures not only proper hardness but uniformity.



Nos. 10 & 15



No. 20

No. 10—Green molded handle. Almost indestructible. Shaped for comfort. Patented Lever-Lock positions, tensions blades automatically. No. 15—Red molded handle, chrome-plate finish. Same features as No. 10.

Long a favorite with mechanics, this gunmetal finish adjustable pistol-grip frame with lever for lock blade features extra easy blade change.



# STAR BLADES

Manufactured by

CLEMON BROS., Inc., Middletown, N. Y., U. S. A.  
Makers of Hand and Power Hacksaw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemon Lawn Machines

Clemon Bros., Inc.  
Middletown, N. Y., U. S. A.

☐ Please send the STAR Metal Cutting Guide that contains information on blade types, cutting techniques, feeds and speeds and general metal cutting information.

☐ Please send the STAR Metal Cutting Chart—A handy guide for the shop metal worker.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_ 3100



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**Alfred V. Bodine**



**Ludlow King**



**Ralph J. Kraut**

## **N.M.T.B.A. Elects Officers**

Alfred V. Bodine, president and treasurer, The Bodine Corp., Bridgeport, Conn., was elected president of the National Machine Tool Builders' Association at its 56th Annual Meeting held on October 22-25 at the French Lick Sheraton in French Lick Springs, Indiana. Ludlow King was re-elected executive vice president of the association.

Ralph J. Kraut, president, Giddings and Lewis Machine Tool Co., Fond du Lac, Wis., was elected first vice president, and Alan C.

Mattison, president, Mattison Machine Works, Rockford, Ill., was elected second vice president. Graham E. Marx, vice president and general manager, The G. A. Gray Co., Cincinnati, Ohio, was elected treasurer, and Walter K. Bailey, president, Warner and Swasey Co., Cleveland, Ohio, was re-elected secretary of the association.

New directors elected were Mr. Mattison, Mr. Marx, and Mr. Julian C. Pease, executive vice president, The New Britain Machine Company, New Britain, Conn.



**Alan C. Mattison**



**Graham E. Marx**



**Walter K. Bailey**



**Julian C. Pease**



# Low cost—high speed hard-facing with the new METCO THERMOspray process



Hard-facing pump rod with  
the Metco Type P ThermoSpray Gun

## High spraying speeds—high deposit efficiencies —simplified application

The advantages of applying hard-facing materials in powder form for lower finishing costs have long been known. But slow spraying speeds, low deposit efficiencies and high material costs have hindered their wide application. Now, with the development of the new METCO Type P THERMOspray GUN and the THERMOspray Hard-Facing Alloys, these disadvantages have been overcome.

The THERMOspray GUN is the first ever developed to operate without compressed air—only oxygen and gas (acetylene or hydrogen) are required. The THERMOspray Powders are new, self-fluxing alloys of the nickel-chromium-boron type especially developed to provide dense, corrosion-resistant coatings with hardnesses varying from RC-30 to RC-65, depending on the alloy used. The new Gun applies these materials

faster than any previously available equipment (8 to 10 lbs. per hr.), with deposit efficiencies of over 95%. Depending on requirements, coatings may be fused after spraying, used semi-fused with a newly developed Metco Process, or left unfused.

**Here is your opportunity to do your own hard-facing at low cost. For further information send off the coupon. No obligation, of course.**



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Engineering Co., Inc.

1177 Prospect Ave., Westbury, L. I., New York  
Telephone: EDGEWOOD 4-1300

In Great Britain: Metallizing Equipment Co., Ltd.  
Chobham near Woking, England

The following trade names are the property of  
Metallizing Engineering Co., Inc.:  
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Metallizing Engineering Co., Inc.  
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Please send me more information

- ☐ about the New ThermoSpray Gun  
☐ about ThermoSpray Hard-Facing  
☐ Please arrange a demonstration in my shop.

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street \_\_\_\_\_  
city \_\_\_\_\_ zone \_\_\_\_\_ state \_\_\_\_\_

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December, 1957

modern machine shop 201



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**BIG jobs**

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Power tilting from 0° to 90°, power rotation through 360°. Accurate to seconds of arc. Lets you machine or inspect many faces in several planes in one set-up. Eliminates expensive jigs and fixtures.

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TILTING ROTARY TABLE**

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#### industry news in brief . . .

**Farrel-Birmingham Company, Inc.**, Ansonia, Connecticut, announces the relocation of its office to 665 West Market Street.

**Lowell E. Tompkins** promoted to manager of credit department, **The Dow Chemical Company**, Midland, Michigan.

**Kenneth E. Wandel** has been appointed direct branch office representative in the Chicago area and **Paul L. Krueger** assumes a similar position in the Philadelphia area, **Standard Gage Company, Inc.**, Poughkeepsie, New York.

**James A. Kyffin** appointed director of purchases and traffic, **C. A. Norgren Company**, Englewood, Colorado.

**Fameco Machine Company**, Kenosha, Wisconsin, recently announced four new appointments: **John E. Glebs** appointed vice president and controller; **Lowell Jensen** promoted to works manager; **Bernard Matter** appointed chief engineer; and **Ronald Ashenfelter** appointed purchasing agent.

**Lester C. Hill** appointed assistant sales manager, **Crucible Sales Division, Crucible Steel Company of America**, Pittsburgh, Pennsylvania. An announcement has been made of an Applied Research Laboratory to be located at **Sanderson-Halcomb Works**, Syracuse, New York. **Dr. A. M. Aksoy** appointed manager.

**Pratt and Whitney Company, Incorporated**, West Hartford, Connecticut, announces the opening of three branch sales offices: in Hartford, Connecticut, at 505 Oakwood Avenue; in Milwaukee, Wisconsin, at 9217 West Center Street; and in Rochester, New York, in the Linden Industrial Park area.

**Michael A. Horlak** appointed new product research and development engineer, **Rotor Tool Company**, Cleveland, Ohio.

**David G. Collins** has been named vice president, **SpeedWay Manufacturing Company**, Cicero, Illinois, a subsidiary of Thor Power Tool Company, Chicago, Illinois.

**Frank J. Fields** appointed works manager, **The Fosdick Machine Tool Company**, Cincinnati, Ohio.

**George M. Brydon** has been appointed general manager, **Butterfield Division, Union Twist Drill Company**, Derby Line, Vermont and Rock Island, Quebec.

**Dr. Arnold P. Howe** appointed assistant to president, **Michigan Chrome and Chemical Company**, Detroit, Michigan.

**Lewin-Mathes Company Division**, Cerro de Pasco Corporation, New York, New York, announced that its low-melting alloys, "Cerrobaze," "Cerrobend" and "Cerromatrix" are marketed by Lewin-Mathes offices located at: 1056 4th Avenue South, Seattle, Washington, managed by **A. D. Cranmer**; 334 North First Street, Minneapolis, Minnesota, managed by **Robert Bergstrom**; and 729 Boylston Street, Boston, Massachusetts, managed by **Frank Patrick**.

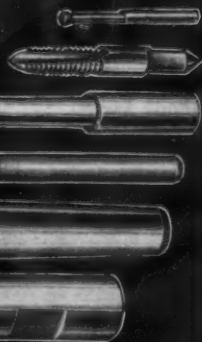
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*Cost less in the Long Run . . .  
. . . because they Run Longer!*

Here's double insurance of finer performance: Years of cutting tool know-how and specialized carbide research insure quality that pays off in more pieces per tool and faster metal removal. P&W Engineering Service helps you select the right carbide tool and the best speeds and feeds for your specific needs. Write for complete information. Available from stock in a complete range of types and sizes. Contact the P&W Branch Office near you, Pratt & Whitney Company, Inc. 25 Charter Oak Boulevard, West Hartford, Connecticut.



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**NOW,  
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... a tap specifically for screw machines. Shorter, more rigid shank. Cuts clean and free without "bellmouth." Reduces tap breakage. Lasts longer. Excellent for all machinable metals. Spiral point, high speed steel, ground thread... plug or bottoming types. Write for complete information.

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WIDE RANGE OF SIZES FROM STOCK AT THE  
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### **industry news in brief . . .**

Wendell F. Carney appointed general sales manager, **The Taft-Peirce Manufacturing Company**, Woonsocket, Rhode Island.

Alfred W. Escoffier appointed manager of Seattle branch, **Thor Power Tool Company**, Chicago, Illinois.

C. C. Garrett Machinery Company, Indianapolis, Indiana, has been appointed exclusive representative in Indiana and Western Kentucky, **United States Drill Head Company**, Cincinnati, Ohio.

Denzil Hawkins and Theodore Rancourt named vice presidents, **The Producto Corporation**, Detroit, Michigan.

Walter H. Brown named midwest sales coordinator, **Standard Pressed Steel Company**, Jenkintown, Pennsylvania. Thomas A. Breen succeeds Mr. Brown as Chicago district manager. William M. Kerrigan appointed manager of Flexloc sales in locknut department. Frank R. Lindh named assistant manager of Flexloc sales and John J. Wiest appointed technical director of locknut department.

The **A. K. Allen Company, Inc.**, announces its change of address to 255 East 2nd Street, Mineola, New York.

Harry C. Kemper appointed chief engineer, **The R. K. LeBlond Machine Tool Company**, Cincinnati, Ohio. Harold J. Siekmann, vice president and chief engineer, recently retired after 47 years of service with the firm.

**Roger M. McCray** appointed district manager in Cincinnati, **Kennametal, Inc.**, Latrobe, Pennsylvania. Mr. McCray replaces **George J. Raible** who recently retired after 19 years with the company. A new district office has been established in Cleveland, Ohio, with **Earl E. Boyer** as district manager. The former Cleveland office has been changed to Detroit district office with **Thomas J. Kniff** as district manager. **Hart Industrial Supply Company**, appointed distributor in Oklahoma.

**The Babcock and Wilcox Company**, Refractories Division, Beaver Falls, Pennsylvania, announces the change of address of the Augusta, Georgia, district sales office to Room 408, News Building, 725-31 Broad Street. **John J. McDermott** named production manager replacing **H. G. Lane**. Four appointments in the Metallurgical

Department have been announced: **John F. Beck** named metallurgist supervisor of technical service; **Clark P. Church** named metallurgist supervisor of process development; **Dr. John F. Ewing** appointed metallurgist supervisor of research; and **Thomas M. Krebs** appointed metallurgist supervisor of customer service.

**John R. Davis** appointed Southeastern representative, Machine Division, **Osborn Manufacturing Company**, Cleveland, Ohio.

**John E. Rowe** named executive vice president, **The Tomkins-Johnson Company**, Jackson, Michigan. Advancement of three men has been announced: **William J. Remund** promoted to vice president in charge of sales; **Adam P. Jankowski** promoted to sales manager; and **Robert L. Curtis** named assistant sales manager.

★ ★ ★ ★ ★

## NOW ... 2-WEEK DELIVERY SERVICE on AIR GAGING PLUGS

TO OWNERS OF P&W AIR-O-LIMIT GAGES... Thanks to our newly organized department devoted exclusively to Air-O-Limit gage plug manufacturing we can now deliver plugs ground to your exact specifications just 2 WEEKS from the time your order is received. This service covers a wide range of popular types and sizes. For complete gage plug specifications and ordering data, write now for your free SELECT-AIRE CHART. Pratt & Whitney Company, Inc., 25 Charter Oak Blvd., West Hartford, Conn.



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MACHINE TOOLS • GAGES • CUTTING TOOLS

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**industry news in brief . . .**

**Alvin J. Jones** appointed director of engineering, **Motch and Merryweather Machinery Company**, Cleveland, Ohio.

**Richard E. Krengel** appointed general manager, **Ex-Cell-O Corporation of Canada Limited**, London, Ontario.

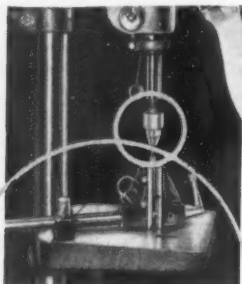
**Ed O'Sullivan** and **Gregg Kirby**, **General Refrigeration**, 1718 King Street, Kitchener, Ontario, appointed sales representatives, **Cincinnati Sub-Zero Products**, Cincinnati, Ohio.

**The Lincoln Electric Company**, Cleveland, Ohio, announces the relocating of three of its men: **Bruce N. Frye**, Atlanta, Georgia, transferred to Columbus, Ohio, district office; **Edwin Williams**, Atlanta, Georgia,

transferred to Birmingham, Alabama, district office; and **Gerald R. Stoeckinger** transferred to Los Angeles, California, district office.

**Denton Hassell** appointed manager of distributor sales, **Allegheny Ludlum Steel Corporation**, Pittsburgh, Pennsylvania. **James L. McGinnis** appointed district sales manager in St. Louis. He succeeds **Carl W. Messinger** who recently retired after serving 38 years with the company.

**Dr. Edgar C. Bain**, assistant executive vice president, recently retired after 30 years of service with **United States Steel Corporation**, Cleveland, Ohio.



**AMAZING  
TWIN TOOLS**

**INCREASE  
DRILL  
PRESS  
PRODUCTION**

**AMF Wahlstrom Automatic Keyless Chuck:** Convert 95% of lost tool-changing time to productive time. A single chuck does the work of several spindles. The greater the load, the tighter the grip. No stopping of the spindle to change tools.

**AMF Float-Lock Instant Change Vise:** Positive anchoring on drill press table. *Floats and Locks* in any position. Holds work safely for accurate drilling and tapping.

*Write for details and name of nearest distributor.*

AMF Tool Division

**AMERICAN MACHINE & FOUNDRY COMPANY**

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## Why designers specify FLEXLOC self-locking nuts

Where products must be tough . . . must stand up under vibration, shock and abuse . . . designers specify rugged, reliable, precision-built FLEXLOC self-locking nuts as fasteners.

**Here's why:** FLEXLOC locknuts are strong: tensile strengths far exceed accepted standards. They are uniform: carefully manufactured to assure accurate, lasting spring tension in the flexible locking collars. And they are reusable: rough screw threads,

repeated removal and replacement, frequent adjustments will not affect their locking life.

Standard FLEXLOC self-locking locknuts are available in a wide range of standard sizes and materials, to meet the most critical locknut requirements. Your authorized industrial distributor stocks them. Write us for complete catalog and technical data. Flexloc Locknut Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

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**FLEXLOC** LOCKNUT DIVISION

**SPS**

JENKINTOWN PENNSYLVANIA

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## THE OLD GRIND GOT YOUR GOAT?

Butt definitely, a good way to meet grinding-wheel problems is . . . head-on. Take your goat by the horn and switch to CINCINNATI (PD)<sup>®</sup> WHEELS.

They offer Positive Duplication—a remarkable achievement in precision manufacturing and quality control that can save you money . . . and increase your production.

You don't need a long gray beard to wise up to (PD) WHEELS. Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel every time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.

Grinding problems will never again get your goat, if you see your Cincinnati Grinding Wheels Distributor. He'll be glad to explain how (PD) WHEELS can save you money and increase production. Or, contact us direct and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, CINCINNATI Milling Products Division, Cincinnati 9, Ohio.

Remember — only CINCINNATI Grinding wheels give you . . .

**PD** POSITIVE DUPLICATION

**CINCINNATI<sup>®</sup>**  
Grinding Wheels

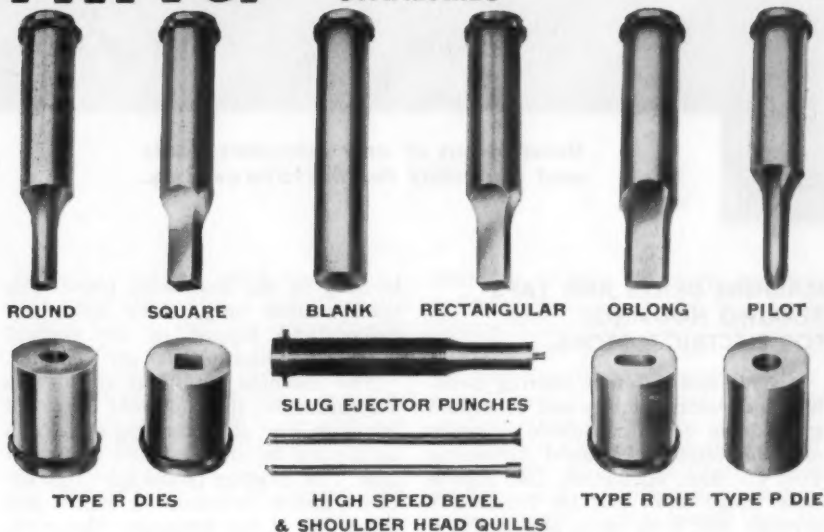
A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

Trade Mark Reg. U.S. Pat. Off.

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# RING PUNCHES AND DIES

## STANDARDS

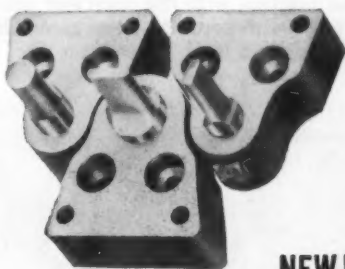


COMPLETELY INTERCHANGEABLE  
SHIPMENTS FROM STOCK  
CHOICE OF STEELS  
HIGH QUALITY  
LONG LIFE  
LOW COST



## SPECIALS

Send prints or sketches for quotation on your requirements. Prompt deliveries—reasonable prices.



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## PUNCH & DIE RETAINERS

Tough alloy retainers accurately machined for Ring Punches and Dies. Ease of mounting saves time and money.

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# RING PUNCH & DIE, INC.

FENTON PLACE

JAMESTOWN, NEW YORK

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new  
shop  
equipment

**Descriptions of new machines, tools  
and materials for metalworking.**

### **MACHINE DRILLS AND TAPS BEARING HOUSINGS FOR ELECTRIC MOTORS**

Twenty-five different bearing housings for electric motors can be drilled and tapped on an automatic sequence machine, built by National Automatic Tool Co., Inc., Richmond, Ind. Frame sizes range from NEMA frame 182 through 326, both open and enclosed motors and front and rear housings.

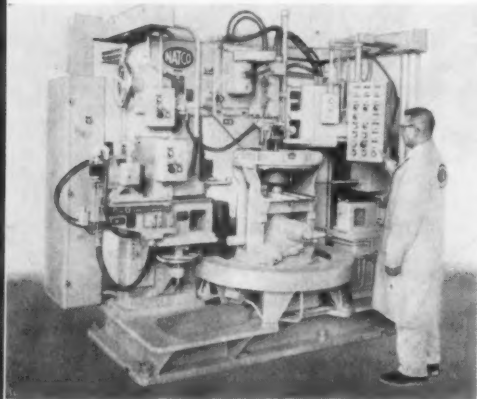
The housing is loaded in a horizontal position with the open end up. For enclosed motors only, two grease holes are drilled and tapped on the rear

housing in the horizontal plane. For open motors only, three holes are drilled and tapped in the vertical plane for mounting the air deflector.

The machine is unique in that to accommodate the different sizes of housings, any of 14 locating plates can be slipped in and fastened into position. The locating plates take into account minor variations in depths and diameters of the housings. Major variations in depth, as well as major changes in diameters, are adjusted for by moving the drilling and tapping units forward and backward. Handwheels permit easy adjustment, and accuracy of location is assured by dowel pins which can be set to provide any of four major adjustments. Tool changes are made quickly, in most instances, through the use of preset tools. The changeover from the largest to the smallest frame size is said to be accomplished in a minimum of time.

In order to process the holes on the different castings which have varying hole locations, a six position rotary table was necessary. On some parts, all positions are used, whereas on other parts several positions are skipped. A four position selector switch on the electrical cabinet selects not only the positioning of the table, but also which heads are to move forward.

One man operates this machine, as well as an adjacent adjustable arm



**Natco Automatic Sequence Machine drills and taps bearing housings for electric motors**

Edited by L. L. BALDHOFF

vertical driller on which the through bolt holes are drilled. Cycle times are comparable so that the operator can unload and load one machine while the other machine is cycling. Production rates on this automatic sequence machine range from 24 to 42 parts per hour, depending upon the type of housing being processed.

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★ ★ ★

### **BROACHING FIXTURE FEATURES FULLY AUTOMATIC LOADING FOR TWO DIFFERENT PARTS**

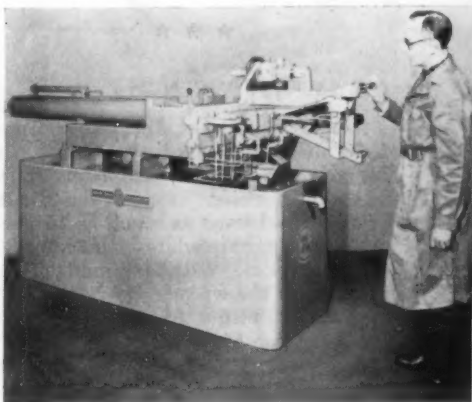
A Red Ring Air Powered Broaching Fixture, featuring fully automatic loading, has been developed by National Broach and Machine Co., 5600 St. Jean, Detroit 13, Mich. All motions in the fixture are operated by air cylinders. Cycle sequencing controls are pilot air valves, with no electrical controls of any type being required to operate the fixture.

The model shown in the accompanying illustration broaches  $\frac{1}{2}$  inch wide flats on the ends of 5 inch long steel shafts of two different electric rotor assemblies at a production rate of 720 pieces per hour. Fully automatic loading is provided by a magazine feed, having three separate air operating cylinders. Broach advance and returned is controlled by a 6 inch

diameter 25 inch stroke air hydraulic cylinder mounted on the end of the fixture. The fixture, loader and broach cylinder unit are mounted on a welded steel base that is provided with integral coolant troughs. A motorized coolant pump is provided.

Provision for handling the two different parts (one has a single broached flat and the other has two; one  $\frac{5}{16}$  inch diameter shaft is longer than the other) is made by means of interchangeable clamping jaws, support jaws and broach holders.

A part in the bottom of the feed magazine is dropped into loading posi-



**Red Ring Fully Automated Broaching Fixture  
with pilot air valve sequencing controls**

## **new shop equipment . . .**

tion by an escapement mechanism operated by an air cylinder. With the part in loading position, a second air cylinder advances the part into broaching location where it is clamped by jaws under a heavy spring load. The broach is then traversed past the part to produce the broached flat. A third air cylinder releases the spring clamping load and the part is retracted to the initial loading position. The broach then returns to its original position. Finally the part is ejected from the fixture by the escapement mechanism as another part falls into loading position. All of these operations take place within a five second operating cycle.

Standard air valves and cylinders are used throughout the fixture design. An emergency dump valve permits a pushbutton control to stop the cycle sequence at any point. Cycle start and stop pushbutton controls are provided for operating the fixture, which occupies a floor space of 40 by 140 inches, and is 60 inches high.

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★ ★ ★

## **AIR IMPACT WRENCH**

Albertson and Co., Inc., Sioux City, Iowa, has announced the Sioux Air Impact Wrench. A completely new mechanical design enables the Sioux Wrench to deliver as much as 15 percent more torque while consuming 30 percent less air. With 90 pounds of air pressure at the wrench, the Model 315 delivers 130 torque foot pounds in ten seconds; the Model 317 delivers 185 torque foot pounds in ten seconds.

Many features insure extra durability in the wrench. Powdered iron bearing surfaces on motor end plates wear long and permit a close air seal. Sub-

stantial ball bearings contribute to long, smooth running. Much of the metal to metal friction, which would normally be present in tools of this type, has been eliminated in the simplified design. With fewer moving parts, the result is claimed to be greater power, efficiency and long life.

A power regulator permits running a series of nuts down to the same degree of tightness. Power regulator setting Number 5 gives full power to blast loose tight, rusted and frozen nuts. Only a 180 degree turn is required to vary the power from setting Number 5 to setting Number 1.

An angle attachment is available for reaching the ratchet wrench spots. A molded rubber ring protects the nose of the wrench, and a convenient wire hanger permits hanging when not in use, or for use in a suspended position.

Both models weigh 5½ pounds and feature excellent balance. Wrench No. 315 with a ½ inch drive has a ⅝ inch bolt size capacity. Wrench No. 317 drives with a ⅝ inch square and has an 11/16 inch bolt size capacity. A metal carrying case is available to hold the wrench and sockets.

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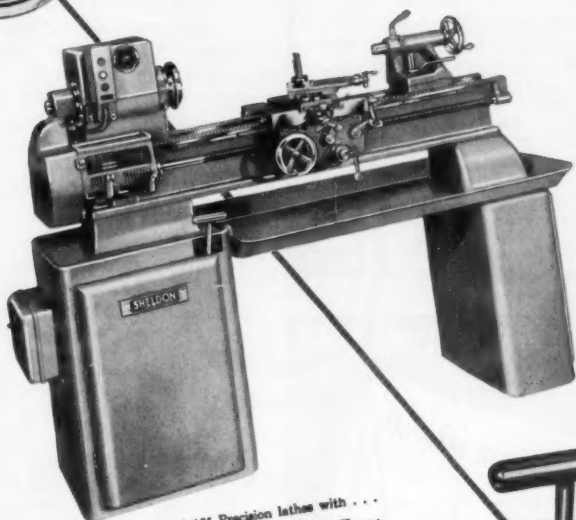
Sioux Air Impact Wrench weighs 5½ pounds





**SHELDON**  
CHICAGO U.S.A.

*Variable Speed*  
**PRECISION LATHES**



A new series of 11" and 13" Precision lathes with . . .  
toolroom accuracy . . . spindle speeds to 2,000 r.p.m. . . .  
instant and automatic selection of speeds . . . increased  
horsepower to spindle . . . and a full range of toolroom and  
production accessories for greater versatility.

### **Write for This New Bulletin!**

complete specifications . . . detailed explanation  
of new variable drive . . . information on many  
new production accessories.

**SHELDON MACHINE CO., INC.**

4250 N. Knox Ave., Chicago 41, Ill.

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December, 1957

modern machine shop 213



**EXTRA LARGE  
SUB-TABLE**

Made expressly for the No. 2 Moore Jig Borer, precision ground. Table measures 4" High x 10" wide x 28" long. By using this large table you avoid using extension parallels.

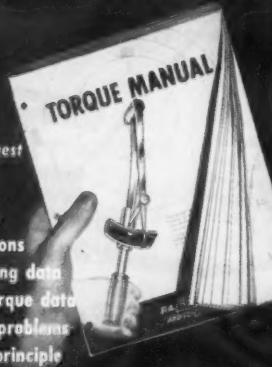
Available for immediate delivery at \$250.00 each, F.O.B. Westfield, Mass. Terms 1% 10 days, net 30 days.

Also 6" x 6" x 6" EXTRA HEAVY ANGLE IRONS precision ground inside and outside (no ribs) to .0003 at \$39.50 each.

**BERKSHIRE TOOL CO., INC.**  
173 ELM STREET, WESTFIELD, MASS.

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**"TORQUE WRENCH" MANUAL**



Sent upon request

Formulas  
Applications  
Engineering data  
Screw torque data  
Adapter problems  
General principle

**P.A. STURTEVANT CO.**  
**ADDISON QUALITY ILLINOIS**

Manufacturers of over 85% of the torque wrenches used in industry

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214 modern machine shop

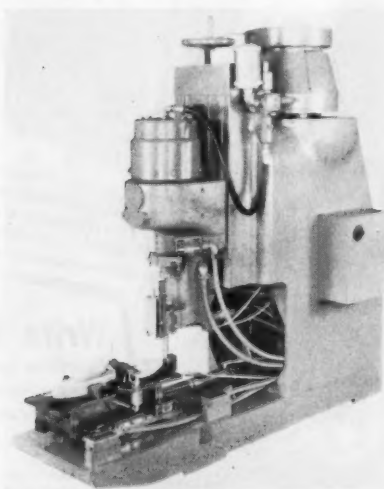
*new shop equipment . . .*

## INSERTER ATTACHMENT FOR AUTOMATIC DRIVING OF ROLLPINS

The Kenhos Corp., 275 Connecticut Ave., Norwalk, Conn., has developed a Rollpin Inserter designed to give completely automatic production of parts or assemblies using rollpins. It feeds and orients both the workpiece and pins, performs the driving operation and recycles without operator attention. Continuous fully automatic operation is obtainable when the inserter is used with the Kenhos Automatic Transfer Machine.

Available in either hand or fully automatic operation at the customer's specification, the attachment features a frictionless cylinder requiring no packing or lubrication. The design minimizes maintenance problems.

The base machine to which the attachment is applied is available in



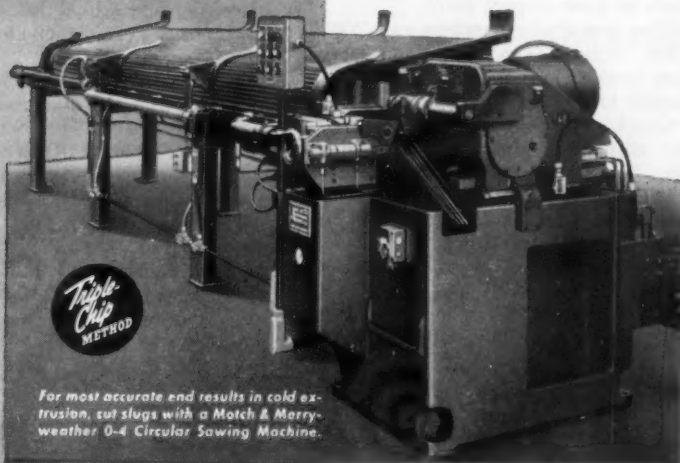
*Kenhos Inserter Attachment is shown here applied to a Kenhos Automatic Transfer Machine*

December, 1957

cold cuts



BY MOTCH & MERRYWEATHER



*Triple-  
Chip*  
METHOD

For most accurate end results in cold extrusion, cut slugs with a Motch & Merryweather 0-4 Circular Sawing Machine.

... make better **COLD EXTRUDED PARTS**



The Motch & Merryweather No. 0-4 Precision Circular Sawing Machine is automatic from the storage table to the finished cut slug. It cuts slugs accurate to  $\pm .002"$  with uniformly square ends and minimum burr. Give your cold extrusion press the opportunity of producing more work than ever before, with more accuracy than ever before, at a lower cost per piece than ever before.

THE  
**MOTCH & MERRYWEATHER**  
**MACHINERY CO.**

MACHINERY MANUFACTURING DIVISION  
CLEVELAND 13, OHIO

*Builders of Automatic Precision Cut-Off, Milling and Special Machinery*

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December, 1957

modern machine shop 215

## new shop equipment . . .

either bench or floor models, is adaptable to a wide range of tooling for production service on hollow rivet, flaring, staking or press fit assembly applications and is adjustable to either push or push-impact drive.

The speed of operation is 1,200 to 1,800 cycles per hour. An adjustable ram head height makes it possible to handle large or bulky workpieces.

Quick change escapement units in the adjustable pin feed permit using pins from 0.062 inch in diameter and 0.187 inch long up to 0.062 inch in diameter and 2.50 inches long. The only adjustment required is for each variation in length of a given diameter Rollpin.

The vibratory feed has an 11 inch diameter feeding bowl and track of a

special, non-catch design, spiral wound wire or plastic tube. The rate of feed is fully adjustable. An electrically controlled air cylinder actuates the escapement for fast feed and return after each ram stroke.

For applications in which it is desired that more than one pin be driven at different locations on the workpiece, a special slide is available. Through a systems of stops this can be performed.

A centrally located electrical control panel controls the machine, which normally requires 115 volt, 60 cycle, alternating current. Other than very low voltages, however, can be supplied upon request.

The unit delivers 3,800 pounds of drive with an 80 p.s.i. air line to 7,300 pounds of drive with a 150 p.s.i. line. Extra heavy driver units are available upon request.

For more data circle 101 on Postpaid Card

★ ★ ★ ★ ★

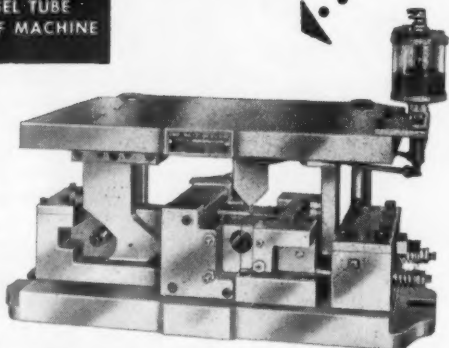
## *Cuts Tubing to Accurate Lengths In* **=SPLIT-SECOND TIME!**

**L**ENGTHS of ½ inch or more are accurately cut to  $\pm .010''$  with each stroke of press—actually less than ½ of a second or faster than any other known method. In addition to being rapid and precise, the Vogel Cut-Off also cuts clean with a minimum of burr and distortion. Many thousands of cuts can be made before shear blades require sharpening.

Unit No. 12 accommodates tubing up to ½" O.D. with 3/32" wall; the No. 2 takes tubing up to 2" O.D. with 1/8" wall.

Ask for sample showing how clean-cut your tubing can be sheared with this machine.

VOGEL TUBE  
CUT-OFF MACHINE



PATENTED

# VOGEL

## TOOL AND DIE CORPORATION

1823 NORTH 32nd AVENUE, MELROSE PARK, ILLINOIS

For more data circle 455 on Postpaid Card



Here they are . . .  
*"Operator-Engineered"*  
 Features that mean  
 high finishes -  
 effortlessly

## NEW HYDRABRASIVE Precision Surface Grinders

No trouble with this rugged column shifting or moving out of line.

Easy to keep clean — modern lines with smooth surfaces.

Column ways are kept free of dirt with these guards.

Head will never wobble like an extension ladder — these bearing surfaces never diminish.

Column ways are lubricated for you as head travels up and down.

Forget spindle lubrication. It's lifetime sealed. Motorized, of course.

No back-breaking crouching to line up work with elevating wheel located here.

No busted knuckles adjusting these table travel dogs.

Never any drag on these ways. Coolant and grit is kept out by patented shields totally enclosing ways.

No danger of flying fragments, no pesky vibration with this heavy cast iron wheel guard.

No wasted time removing metal with this big 12" wheel.

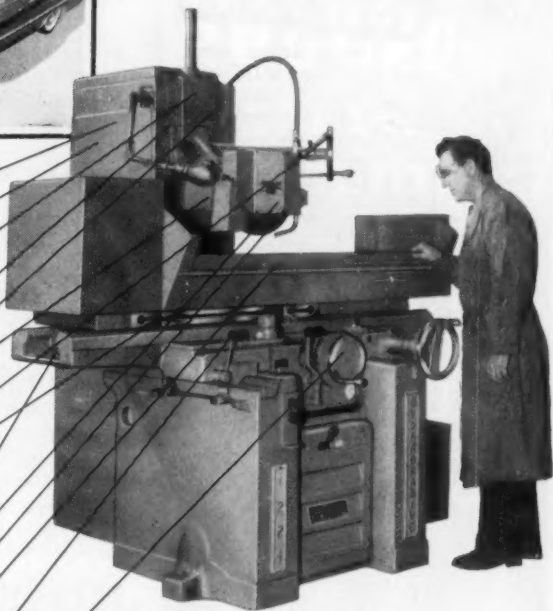
Telescoping waterguards easily adjust.

Power feed and handfeed—standard equipment — can be interchanged without waiting for oil to drain out of cylinders. Safe, too!

You will like the solid feel of these smooth, recessed hand controls. And, the graduations are direct, big and easy to read.

Heat expansion won't spoil your work with this air cooling, coupled with simple, low pressure hydraulic system. You can roll the entire unit right out this door, too.

You won't stub your toes trying to get close to these grinders.



Hydrabrasive 824 — 8" x 24" x 12"  
 Hydrabrasive 1218 — 12" x 18" x 12"  
 Hydrabrasive 1224 — 12" x 24" x 12"

**ABRASIVE**  
 MACHINE TOOL COMPANY  
 EAST PROVIDENCE, RHODE ISLAND

**FREE!** All Hydrabrasive "operator-engineered" features are fully illustrated and described in this big 6 page catalog. Write for your copy now.

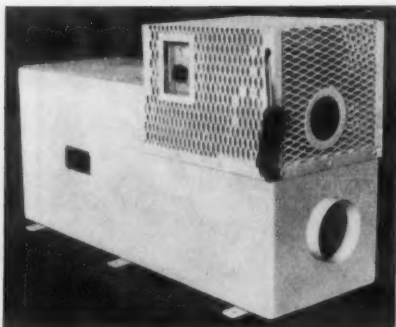


For more data circle 456 on Postpaid Card

**new shop equipment . . .**

## **HUMIDITY CONTROLLER**

The development of a controller for delivering constant humidity air has been announced by the Universal Dynamics Corp., Dept. A, Box 9797, Arlington, Va. The Universal Dynamics Humitrol maintains the relative hu-



**Universal Dynamics Humitrol Unit**



**NEW NESTING TYPE  
TOTE PANS**

Sturdy 16 ga. metal.  
20" long x 12" wide  
x 6 1/4" deep. Drag  
holes and handles at  
both ends.

**J. L. LUCAS & SON, INC.**  
Bridgeport 5, Conn.

For more data circle 457 on Postpaid Card

**\* W.H.O.'s  
ALWAYS  
FIRSTTEST**



with the bestest  
precision  
screw machine products.

**CAP SCREWS • COUPLING BOLTS  
SET SCREWS • MILLED STUDS**  
... our specialty

**\* Wm. H. Ottemiller co.**  
YORK, PENNA.

For more data circle 458 on Postpaid Card

218 modern machine shop

midity level within plus or minus 1/4 percent r.h., or better, in an air or gas stream. The unit is composed of a sensing element, control system and modulating device, all integrally mounted, and is for use in conjunction with dehumidifiers, humidifiers and air conditioning equipment. It is available in sizes ranging from 20 c.f.m. upward. The control point is readily set by adjusting a calibrated knob. Operating over a wide temperature span, the unit is accurate in a 3 to 98 percent relative humidity range. Typical applications of the Universal Humitrol Unit include drying ovens for plastic compounds, laboratories, freon handling operations, drug processing, industrial process control and generally in all installations where a flow of constant humidity air (or gas) is required.

For more data circle 102 on Postpaid Card

**READ TEMPERATURES  
FAST**



**ACCURATELY  
with PYRO  
OPTICAL PYROMETERS**

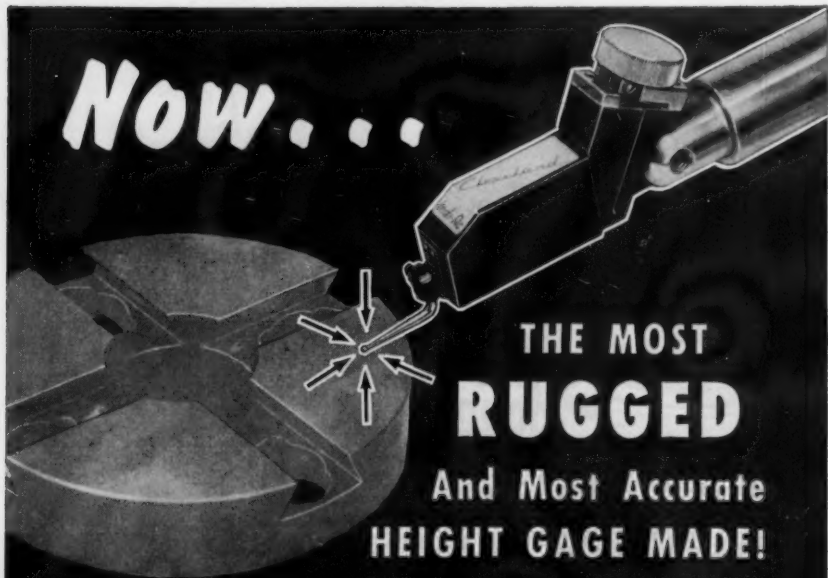
Send for catalog No. 85  
**PYROMETER INSTRUMENT CO., INC.**  
Bergenfield 42, New Jersey

For more data circle 459 on Postpaid Card

December, 1957



Now...



## THE MOST RUGGED

And Most Accurate  
HEIGHT GAGE MADE!

Delicacy or fragileness no longer need be associated with accuracy!

The new PROTECTOR Gage Tip\* provides complete protection against BLOWS FROM ALL DIRECTIONS — even head-on — and the Cleveland IND-AC Electronic Height Gage still remains accurate to MILLIONTHS of an inch.

An accidental blow, due to handling, or mistake in setup, merely deflects the Gage Tip instead of transmitting the blow and damaging the gaging elements.

Only available on new Cleveland IND-AC Electronic Height Gages—or as a replacement for standard tips on IND-AC'S now in service.

\*Patent Applied For.

*Write for complete details . . .*

*Cleveland* INSTRUMENT COMPANY  
735 Carnegie Avenue • Cleveland 15, Ohio

For more data circle 460 on Postpaid Card

December, 1957

modern machine shop 219

*new shop equipment . . .*

**PORTABLE ELEVATING TABLE  
LIFTS AND MOVES LOADS  
UP TO 2,500 POUNDS**

Big Beulah is the name given to the die handling table which has been added to the line of Portelevators manufactured by The Hamilton Tool



**Big Beulah Portable Elevating Table**

**Here's  
the  
dope!**

**WRITE  
for  
SAMPLE**

**DRYS FAST-RESISTS OIL  
WON'T CHIP, CRACK OR FLAKE OFF!**

For more data circle 461 on Postpaid Card

Co., 828 South Ninth St., Hamilton, Ohio. This table rolls, lifts, lowers, pushes and pulls. It lifts loads up to 2,500 pounds, transports them and slides them to another surface without manual strain or risk of damage to either load or man.

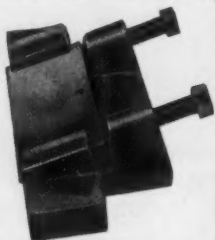
Big Beulah is ideally suited to the work of transporting dies from storage to the press, but may be used also for a wide variety of everyday lifting, moving and maintenance work around shops, stores, mines, quarries, warehouses and transport companies.

**QUICK SURE GRIP...**

FOR ANY WORK ON ANY MACHINE TABLE

**HART DIVIDED  
MACHINE VISE JAWS**

Write for circular **WALTER W. FIELD & SON, INC.**  
39-51 HAYWARD STREET, CAMBRIDGE 42, MASS.



For more data circle 462 on Postpaid Card

**O. S. Walker offers  
a complete new line  
of permanent magnetic chucks!**



Now, from O. S. Walker, the originator of magnetic chucks, comes a completely new, full line of chucks, with the most permanent magnets ever produced! They're ceramic\*, with many times the coercive force of alloy magnets. The face is *all steel*, with no soft insulating material. These chucks offer many important advantages:—

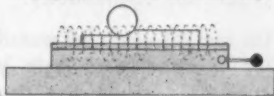
- Weight is 50% less than conventional permanent chucks; minimizes reciprocating table inertia.
- Their low, low height gives greater-than-ever machine capacity.
- Fine pole divisions give maximum holding power.
- All magnetic fields are controlled to prevent magnetization of machine table or ways.

Write for details.

\*Patent applied for.

**... perfect  
for milling, too!**

These new chucks are perfect for milling or planing due to their exclusive construction; Cutter is constantly demagnetized as it progresses, with no fouling of cutter and work with chips!



† O. S. Walker magnets are polarized horizontally!

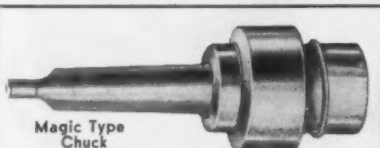
**O. S. WALKER** COMPANY, INC.  
WORCESTER 6, MASSACHUSETTS

*Permanent magnetic and electro-magnetic rotary and rectangular chucks,  
demagnetizers, lifting magnets, vacuum chucks.*

**For more data circle 463 on Postpaid Card**

**new shop equipment . . .**

The reinforced top plate has an area of 748 square inches (22 by 34) and is fitted with eight recessed, free rolling conveyor rollers for ease in moving loads. A ram, impelled by a screw and nut device, travels the length of the top plate, pushing loads



Magic Type  
Chuck

## THE COLLIS MAGIC-TYPE CHUCKS

Reduce production costs with Collis Magic Chucks. Now tools can be changed without stopping or slowing down the spindle. Boring, counter boring, drilling, reaming, tapping, etc., can be performed practically continuously.

Let our 40 years of manufacturing experience help your customers select the proper equipment for the job.

**"Call Collis For Service"**

### THE COLLIS CO.

Dept. A, Clinton, Iowa

from the table to the press or storage shelf, and pulling loads from the press or storage shelf to the table.

The ram front extension provides means for pushing a load into the press or onto a shelf a maximum of 14 inches from the front edge of table top plate. This front extension is hinged to the ram by means of a pull-pin and may be swung aside or demounted at will.

Vertical movement of the top plate is 25 inches; from 35 inches minimum to 60 inches maximum above floor level. An extra fast lift mechanism provides rapid movement for light loads or quick return.

Leverage is exerted through the worm, worm gear and screw device.

Big Beulah rides on 9½ inch metal wheels and 4 inch metal casters. She is thoroughly braced and reinforced, provides three table surfaces and four point support for the load.

She can be made to stand still, as required. A wedge locks the conveyor rollers and a pawl locks the lifting mechanism. Floor lock and two turn-buckle hooks prevent movement of the table during loading and unloading.

A top plate, similar to that used on Big Beulah, may be obtained separately for use as a flange mounted accessory on other tables.

For more data circle 103 on Postpaid Card

GRIND THE  
*Eastern Centerless  
Way*

WE SPECIALIZE  
20 CENTERLESS GRINDERS

ESTABLISHED 1939

Eastern Centerless Grinding Co.  
470 Tolland Street East Hartford 8, Conn.

For more data circle 464 on Postpaid Card

For more data circle 465 on Postpaid Card

**NOW—put this  
BRAND NEW MAGNETIC CHUCK  
to work for you!**

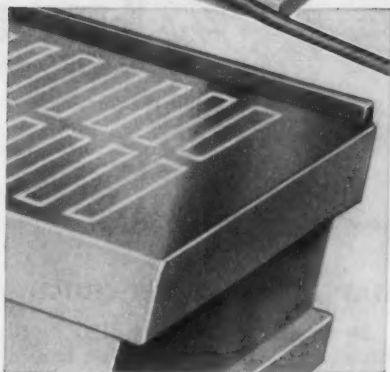


**PRECISION  
FINE-GRID DESIGN**

***Poles 37% closer together***

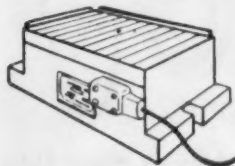
Greater holding power for small and large pieces.

Hard Epoxy resin separators or Magna-Lock special soft metal. Epoxy resin separators are easy to grind in and are particularly suited for electrolytic grinding operations because they resist electrolytic action. Magna-Lock special soft metal is preferred by some and is available as an alternate material for all Magna-Lock fine grid chucks.



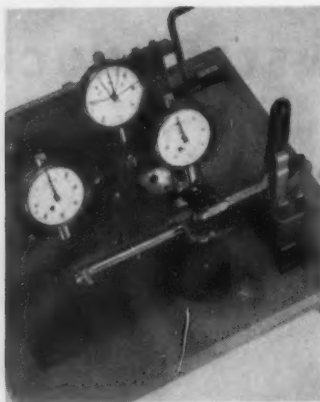
Available in all sizes.

It will pay you to get all the facts about this powerful new Magna-Lock magnetic chuck *now*. Write Dept. MM127.



***Hanchett* MAGNA-LOCK  
CORPORATION**  
**BIG RAPIDS, MICHIGAN, U. S. A.**

*Designers and makers of a complete line of magnetic chucks and devices.*  
For more data circle 466 on Postpaid Card



## SPECIAL GAGES

Federal designs Indicating Gages for inspecting and controlling every type of dimension. Use this invaluable experience when you need accurate, fast and low cost gages which *show* how you're doing. Ask us if we have already designed and built a gage that will fit your special requirement. You'll save time and money. Contact our local sales engineer or write for recommendations.

**FEDERAL PRODUCTS CORPORATION**

71412 Eddy Street • Providence 1, R. I.

Ask **FEDERAL** First

FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic - for Inspecting, Measuring, Sorting, or Automation Gaging

For more data circle 467 on Postpaid Card

★ ★ ★ ★ ★

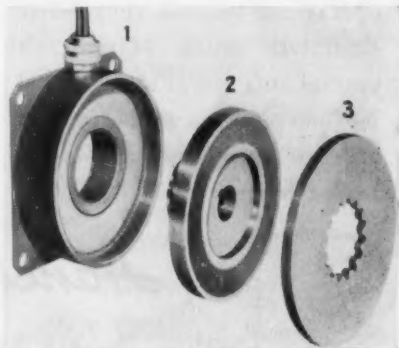
**new shop equipment . . .**

### STATIONARY MAGNET CLUTCH

Stearns Electric Corp., 120 North Broadway, Milwaukee 2, Wis., has announced the release of the No. 5 SM Stationary Magnet Clutch. This is a high quality, low cost clutch incorporating three main parts: (1) magnet body; (2) drive member and (3) driven member, as shown in the accompanying illustration.

These clutches are manufactured in sizes ranging from 1½ inches in diameter up to 5 inches, with torque ranges from 25 ounce inches up to 170 inch pounds. All clutches are wound for direct current, with maximum ratings ranging from 28 volts on the smaller clutches to 90 volts on the larger size stationary magnet clutches.

The outstanding features of these units are the stationary magnet that eliminates collector rings; high quality friction linings that give high torque values; simplicity of design, mak-



**Stearns No. 5 SM Stationary Magnet Clutch**



ing it easy to adapt to machine tools, electronic computers and many other applications.

For more data circle 104 on Postpaid Card

★ ★ ★

## PORTABLE NIBBLER

You can cut a jigsaw puzzle out of  $\frac{1}{8}$  inch mild steel, or even  $\frac{1}{4}$  inch softer materials like plastics, with the portable, air powered nibbler produced by Buckeye Tools Corp., Division 17, Dayton 1, Ohio. Used on partially assembled products, or on large, cumbersome workpieces, this tool handles many jobs for which stationary cutting tools are not adaptable.

Lightweight and compact, the Buckeye Nibbler eats its way through the material at a 5 to 6 foot per minute clip, makes a sharp, clean cut, free from distortion on both sides. You need not start the cut at the edge of



Buckeye Air Powered Portable Nibbler

the work; just provide an access hole any place on the workpiece and the nibbler takes over from there; it goes anywhere you direct it. Just finish the cut and back the tool out of the slot for partial cuts. You can nip off an edge, even as narrow as  $\frac{1}{16}$  inch.

Right or left hand rams are available for special work on curved and corrugated surfaces. This unit has a replaceable punch.

For more data circle 105 on Postpaid Card

★ ★ ★ ★ ★

## AUTOMATION GAGING

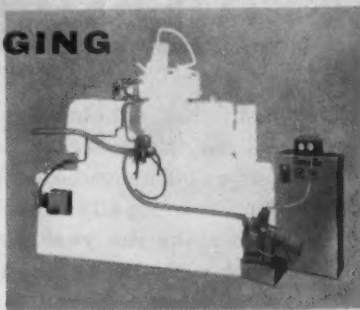
Federal gives you the advantages of real flexibility in meeting your needs for automatic and control gaging.

### 1. FOUR GAGING SYSTEMS TO CHOOSE FROM . . .

Federal provides you with a choice of systems . . . an important advantage in meeting your needs adequately and economically.

**2. COMPLETE GAGES . . .** Federal will completely engineer and build your automation gage . . . provide you with the dependability and top performance that protects your investment.

**3. STANDARDIZED COMPONENTS . . .** Federal can help you economize in



assembling your own automation gage by supplying you quickly with standardized, field tested components.

**FEDERAL PRODUCTS CORPORATION**

71412 Eddy Street • Providence 1, R. I.

Ask **FEDERAL** First

FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic - for Inspecting, Measuring, Sorting, or Automation Gaging

For more data circle 468 on Postpaid Card

**new shop equipment . . .**

**CARBIDE CHUCKING REAMER  
HAS STRAIGHT SHANK**

Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich., has introduced a line of straight shank carbide chucking reamers. The design features solid carbide flute section, instead of the usual carbide tipped flutes. The ad-



*Super Straight Shank Chucking Reamer*

vantages are said to be much greater rigidity with consequently reduced chatter, long productive life between grinds and less chance of breakage.

These reamers are identified as List No. RCB, decimal sizes 0.230 to 0.760 inch; List RCS, fractional sizes  $\frac{1}{4}$  to  $\frac{3}{4}$  inch.

For more data circle 106 on Postpaid Card



Here's to

*Happy  
Holidays*



With the happy holiday season upon us we rise to the occasion for a toast to our good customers and friends who have so loyally contributed their part to make the year pleasant and profitable. So here's to you with our best wishes for a

*Merry Christmas  
and Happy New Year*

**THE WELDON TOOL COMPANY**

3000 Woodhill Road • Cleveland 4, Ohio

For more data circle 469 on Postpaid Card

226 modern machine shop

★ ★ ★  
**DOVETAILED  
STRAIGHT-  
EDGES**

A complete line of semi-steel dovetailed straightedges, in sizes ranging from 18 to 84 inches in length, has recently been announced by The Challenge Machinery Co.,



*Challenge  
Straightedges*

December, 1957



# MORE STRIKING POWER!

## **SOFT HAMMERS**

C/R Jawhead Hammers are the best "soft" hammers you can buy. They speed work, reduce fatigue and increase safety—and never mark or spoil finished work. Oversize solid hickory handles are longer, stronger with heads locked on for life. They'll actually save you money in better work and longer life.

**C/R RAWHIDE FACES:** made of specially processed water buffalo rawhide compressed to size under hydraulic pressure. No other known material will transmit greater striking power.

**NEW! NYLON FACES:** for all C/R Hammers, interchangeable with rawhide faces. Unusually resistant to heat, oils, moisture and most acids.

*Buy C/R Jawhead Hammers from your local industrial supplier—or write for this illustrated brochure.*



**CHICAGO RAWHIDE MANUFACTURING CO.**  
1233 Elston Avenue Chicago 22, Illinois  
In Canada: Distributed by Chicago Rawhide Mfg. Co. of Canada, Ltd., Hamilton, Ont.  
Export Sales: Geon International Corp., Great Neck, N. Y.

HAMMER



DIVISION

**CHICAGO  
RAWHIDE**

For more data circle 470 on Postpaid Card

**new shop equipment . . .**

MMS-9, Grand Haven, Mich. These units, which are widely used to check accuracy in scraping the dovetails of machine tool beds, are available in nine standard sizes. The working surfaces are accurate to within 0.0002 total inch runout. The standard unit has one side at a 45 degree angle.

For more data circle 107 on Postpaid Card

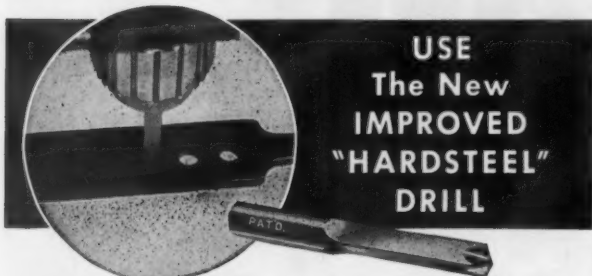
**AUTOMATIC SAW  
SHARPENING MACHINE**

The development of a machine, which automatically sharpens all circular metal cutting saws from 1/2 inch to 14 inches in diameter, from finest teeth up to 2 per inch, has been announced by Hamco Machines, Dept. K, 97 Mt. Hope Ave., Rochester 20, N. Y. Carbon and high speed steel blades may be ground with equal ease. It may be used on all steels, brass,

copper, bronze, aluminum, plastics and so on. Arbors are supplied for hole sizes ranging from 1/4 to 1 inch in diameter.

Master indexing makes it possible to practically make your own saws by cutting in all new teeth with perfect concentricity or to change the number of teeth in a saw to more or

**Drill Hardened Steels  
without Annealing —**



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drillings, countersinking, counterboring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon-high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly.

Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

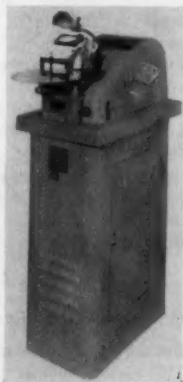
**You Harden It—We'll Drill It—  
With "HARDSTEEL"**

**BLACK DRILL COMPANY, INC.**  
1372 East 222nd St. • Cleveland 17, Ohio



**"HARDSTEEL"**

For more data circle 471 on Postpaid Card



**Hamco Automatic  
Saw Sharpener**

# Now! A Complete Line of Self-Locking Microsize UNBRAKO Socket Cap and Set Screws

**Nos. 0, 1, 2 and 3 in alloy steel and stainless steel  
are available with the Nylok\* feature**

You effect major economies in time and money when you design and assemble small devices with self-locking microsize UNBRAKO socket screws. These close tolerance screws won't work loose. They simplify standardization of small devices where maximum reduction of weight is required without sacrifice of strength. They eliminate the necessity of designing costly special screws to fasten tiny parts in compact assemblies and they prevent the waste of production time while waiting for delivery of special screws.

In addition to having the overall advantages of microsize UNBRAKO socket screws, these screws can be used in holes tapped in soft or die cast materials without stripping threads and ruining expensive work. Also the set screws can be used with hardened shafts, since they lock against the threads of the tapped hole.

All UNBRAKO socket screws can be supplied with the self-locking Nylok feature. The UNBRAKO with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Seated or not the screw locks positively wherever wrenching stops. The screw won't work loose because the tough resilient nylon pellet forces mating threads together.

Self-locking microsize UNBRAKO socket cap and set screws are available in sizes #0 through #3, in heat treated alloy steel (plated or unplated) and stainless steel, at your authorized industrial distributor. To serve you well, he also carries a complete stock of other self-locking UNBRAKO socket screws. Or write us for literature and samples. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

\*T.M. Reg. U.S. Pat. Off., The Nylok Corporation

*We also manufacture precision titanium fasteners. Write for free booklet.*

The logo consists of the letters 'SPS' in a bold, stylized, sans-serif font. The 'S' is particularly large and the letters are closely spaced.

**Jenkintown • Pennsylvania**

Standard Pressed Steel Co. • The Cleveland Cap Screw Co. • Columbia Steel Equipment Co., Inc. • Cooper Precision Products • Standco Canada Ltd. Unbrako Socket Screw Co., Ltd.

**For more data circle 472 on Postpaid Card**

**December, 1957**

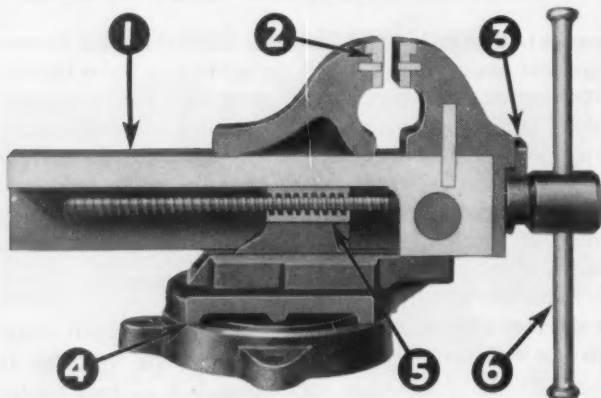
**modern machine shop 229**

## **new shop equipment . . .**

less per inch as desired. It is also possible to sharpen up to 6 or 7 saws at one time. However, the greatest advantage of master indexing is that it is possible to sharpen saws time after time with a minimum of setup and operator attention, thereby allowing free time for other work nearby.

For more data circle 108 on Postpaid Card

## **extra vise features**



## **no extra cost**

It makes sense to standardize on Desmond-Simplex vises. You pay no more, but you get more: 1. All-steel slide, milled from "the solid." 2. Step-milled jaw inserts. 3. Outside screw retainer. 4. Full 360° swivel base. 5. Longer, stronger vise nut. 6. Non-pinching type handle. Write for catalog and name of your Desmond distributor.

## **Desmond-Simplex** **STEEL SLIDE VISES**

**THE DESMOND-STEPHAN MFG. CO., Urbana, Ohio**  
For more data circle 473 on Postpaid Card

230 modern machine shop

## **ARBOR HAS BUILT IN HYDRAULIC PRESSURE FOR POSITIVE POSITIONING**

A and C Engineering Co., 12024 East Nine Mile Rd., Warren, Mich., has recently introduced its Hydra-Lock Arbor, which is a hydraulically expanded, precision tool for internal or external chucking of parts or tools for all types of machining, grinding and inspection operations. Hydra-Lock Arbors are expanded by a self-contained

hydraulic system, which is claimed to assure only true, equalized, accurate centering force.

Hydra-Lock can easily locate on a pitch diameter of internal or external splines or gears; on threads; and in tapered, elliptical or bell mouthed holes.

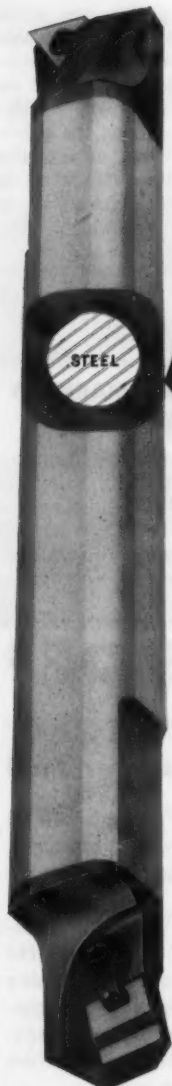
The accompanying illustration shows the newest member in the Hydra-Lock Line. It is called the "Arbor on Arbor." It has no external moving parts to get jammed with chips or grinding



**A and C Hydra-Lock Arbor**

December, 1957





Jobs that "couldn't be done" before...

NOW easily handled with

## The NEW KENNAMETAL\* ENCASED

### Kendex\* Boring Bars

If you have been having boring-bar troubles, here are some experiences that will interest you:

... At one of the nation's largest steel mills, the shop was unable to complete the contour boring of even a single steel tube, because of extreme chatter of the steel boring bar. A Kennametal encased Kendex boring bar was substituted... and the chatter was completely eliminated.

... At another plant, holes were being bored with a steel boring bar equipped with pilot. The holes were roughed at 950 RPM with a 1-inch per minute feed, and finished at 2-inches feed. Tool life averaged ten holes per grind. The tool cost per piece averaged \$0.49 each for more than 4400 pieces over an 18-month period. Furthermore, at least 50% of the holes had to be reamed either to correct size or taper.

When a Kennametal encased Kendex boring bar was substituted, feeds

were almost doubled—to 2 inches per minute roughing and  $3\frac{1}{2}$  inches per minute finishing. Tool life has been increased to 70 holes per cutting edge on roughing, and 80 holes per edge on finishing, with a tool cost per piece of \$0.08. Holes are absolutely true to size and taper—the first time the shop had ever been able to hold dimensions with such consistency. It is anticipated that speeds and feeds can be substantially increased, which will effect further savings.

... A well-known equipment manufacturer is using a  $1\frac{3}{4}$ -inch Kennametal encased bar to bore cast steel at 350 feet per minute, .020-inch feed and approximately  $\frac{1}{2}$ -inch depth of cut. The bar is used at full overhang—about 12 inches—and no chatter or bar deflection is experienced.

Kennametal Encased Kendex Boring Bars are available in a range of sizes. For information, write: KENNAMETAL INC., Latrobe, Pa.

C 1003

#### DOUBLE-END TYPE



TURNING, METAL AND WOODWORKING TOOLS

WEAR AND HEAT-RESISTANT PARTS



INDUSTRY AND  
**KENNAMETAL**  
... Partners in Progress

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ABRASION, CORROSION-RESISTANT PARTS

PERCUSSION AND IMPACT PARTS

## **new shop equipment . . .**

dust. The self-contained hydraulic system affords equal and uniform expansion on every portion of the gripping surface. The "Arbor on Arbor" consists of a base expanding arbor, on which sleeves or wheels of any size can be used. The same expansion is provided on the o.d. of the wheel as on the base arbor.

The built in hydraulic pressure system of the Hydra-Lock Arbor is actuated by either air or hydraulic pressure for high speed operations. However, for low speed operations on high precision inspection, the actuation is done manually. The hydraulic pressure builds up a force, up to 10,000 pounds p.s.i., which stretches the steel sleeve uniformly outward and with controlled accuracy. Using a solid sleeve, the expansion is up to 0.003

inch per inch of arbor diameter, while with a split type sleeve the expansion is 0.010 inch per inch of arbor diameter. All parts are held rigidly and securely in position by reason of this internal pressure exerted on the arbor. Since there are no loose or movable parts on the arbor, there is said to be no problem of centrifugal force throwing the arbor out of balance, regardless of revolutions per minute.

For more data circle 109 on Postpaid Card

★ ★ ★

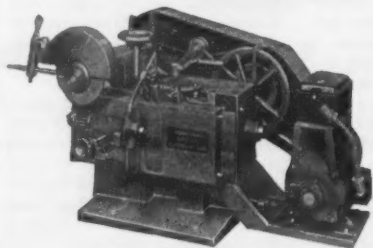
## **COMBINATION ROLL MARKING AND STAMPING MACHINE**

The Noble and Westbrook Manufacturing Co., 25 Westbrook St., East Hartford 8, Conn., has announced a machine for automatically performing two marking operations on aircraft engine valve tappet guides. Workpieces

# **This Investment PAYS OFF**

## **Automatic Metal Saw Grinder Cuts Costs**

**. . . Makes Money For You!**



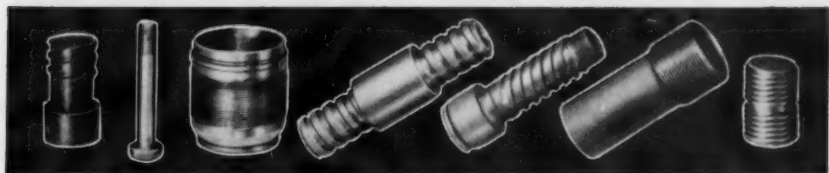
Wardwell's "35-T" will sharpen up to 115 saws .015 thick at one time. This includes slitting and screw slotting saws and milling cutters. Takes saws from 2" to 5 1/2" diameter. Completely automatic. No attention is required after machine is started. These ingenious, compact and sturdy grinders are saving and making money for their owners all over the world.

Write for Bulletin 35T

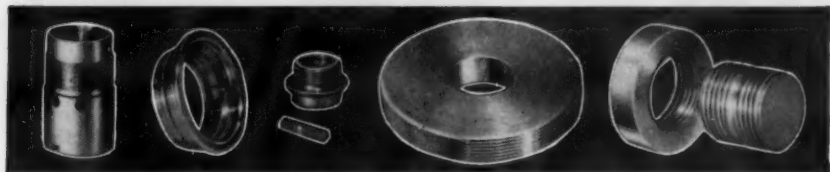
**Maker of Largest Line of Saw and Tool Sharpening Machines**

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**NO OTHER SINGLE POINT MACHINE  
THREADS PARTS AS FAST, WITH  
SUCH FLEXIBILITY AND VERSATILITY...**

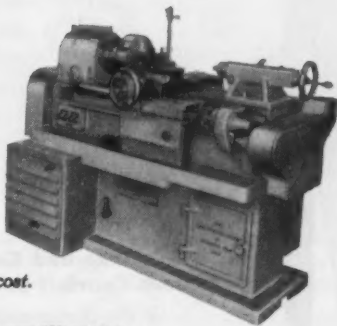


**...as the new COULTER "B"**



**WITH NO LIMIT TO THE NUMBER OF  
PARTS—PITCH—DIAMETERS!**

The new, mechanically operated COULTER "B," with completely automatic threading cycle control; quick changeover features for short runs; skip feed for multi-start; infinite spindle speeds; carriage positioning adjustments; internal clapper type threading bar and attachment; and simple pick-off gears—*guarantees to take the guesswork out of threading at low, low cost.*



*For more detailed facts ask for the new "B" catalog.*

**The James Coulter Machine Co.**

141 James Street, Bridgeport 4, Conn.  
Machine Tool Builders Since 1896

For more data circle 476 on Postpaid Card

December, 1957

modern machine shop 233

## **new shop equipment . . .**

are roll marked with a two line identification on the smaller o.d. surface and, also, stamped with a timing mark on the upper flat surface.

Designated as the Model 486, this machine features a motor driven continuously rotating work dial with eight studs, or mandrels, over which the

workpieces are placed. The mandrels support the workpieces during marking and permit free rotation as the workpiece travels across the face of the marking die. The work dial is also equipped with heat treated wear plates to take the stamping shock. Identification marking is accomplished by special interchangeable steel type in a spring loaded compensating die head. Spring pressure adjustment controls

the depth of the mark and uniformity from piece to piece, regardless of variations in diameter. The time mark is accomplished by an air press, mounted on a post at the left rear of the machine. The air press is vertically adjustable for stamping various lengths of workpieces and is operated by a solenoid valve from a

# **B & W**

New Flat Type



## **SPOTTING & CENTERING DRILLS**

and Adapters

Produce accurate centers on screw machine work for starting follow-up drills.

Note short overall length — no body clearance. With point supported up close to the job — assure a true start or center, and perfect alignment.

Reduce tap breakage — use them to spot holes for tap drilling.

### **Right or Left Hand Cut — Same Price**

Stocked in 90° and 118° Drill Points. Specify right or left cut when ordering.

T	W	L	Price	T	W	L	Price
1/8	1/2	1 1/2	\$2.00	1/8	1	2 1/2	\$3.60
3/8	5/8	1 1/2	2.60	3/16	1	2 1/2	4.40
3/16	5/8	1 1/2	3.00	3/4	1	2 1/2	4.60

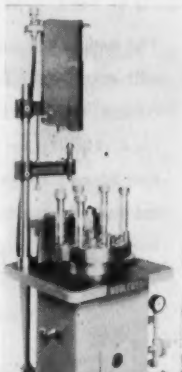
**B & S blanks and Center-Lock blanks for  
Do-It-Yourself people now in stock**

*Write for prices on blanks and  
drill grinding fixture.*

## **B & W PRECISION PRODUCTS CO.**

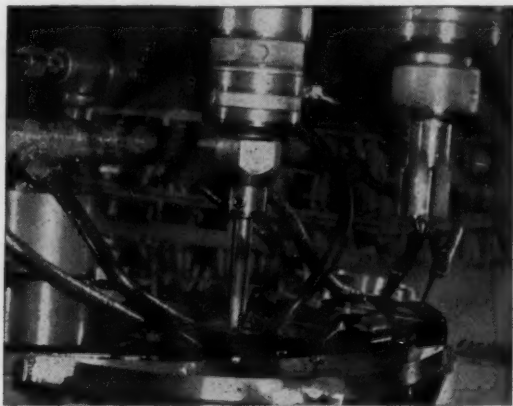
11393 E. Eight Mile Rd., P.O. Box 3865  
Detroit 5, Michigan, Engineering Dept. M.

For more data circle 477 on Postpaid Card

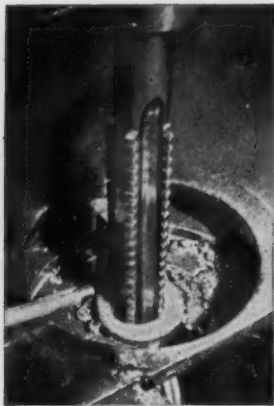


**Noblewest Roll  
Marking and  
Stamping Machine**

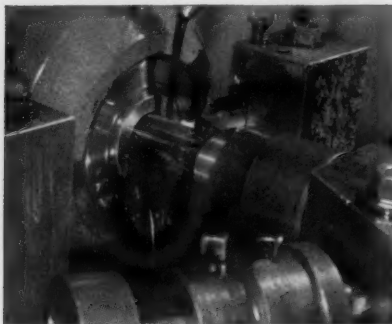
## Cutting Tool and Gaging Methods...by **BESLY**



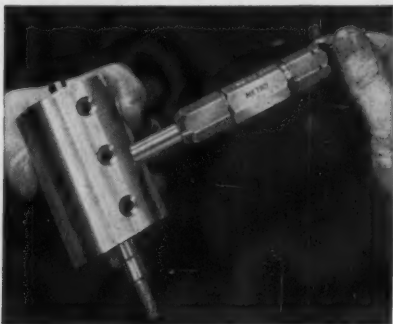
**MATCHED TO THE JOB**—At The Chicago Screw Company, Bellwood, Illinois, two sizes of Besly taps, poised above an indexing table, are ready to tap C-1141 steel parts. Operating alternately, the smaller  $\frac{3}{8}$ "-24 Besly tap quickly threads a hole, then the work indexes beneath the  $1\frac{1}{2}$ "-24 Besly tap and a larger hole is threaded.



**SQUARED OFF**—Templeton, Kenly & Company, Broadview, Ill., cuts heavy, almost square threads in bases of 12 to 24-ton screw jacks with Besly acme thread form taps.



**TOUGH GOING**—Here you see a C-1018 high carbon steel nut being threaded by a Besly  $1\frac{3}{4}$ " tap. Extremely abrasive carburized and heat treated material is difficult to tap. However, Besly taps proved they could "take it".



**ASSURED ACCURACY**—To assure that holes in planer cutter head assemblies provide precise fits for set screws, SKIL Corporation, Chicago, checks for accuracy with Besly-Metro Double End Reversible Cylindrical Plug Gages.

Prove to yourself that Besly Cutting Tools and Gages produce better results. Put them on trial on your toughest jobs, and check the difference in longer tool life, less down time, fewer rejects and faster production. If you'd like to try Besly tools or use Besly's Engineering Service, see your Besly distributor for details, or write us . . .

Engineering, Service and "Specials" . . . are a Besly Specialty



**BESLY-WELLES**  
CORPORATION

Est. as C. H. Besly & Co. 1875

108 Dearborn Ave., South Beloit, Illinois

TAPS • DRILLS • REAMERS • END MILLS • TOOL BITS • GAGES  
CARBIDE TIPPED TOOLS, BLANKS, TOSS-AWAY INSERTS & HOLDERS

For more data circle 478 on Postpaid Card

December, 1957

modern machine shop 235

## new shop equipment . . .

micro-switch, which is actuated by pins in the work dial.

This Noblewest Model 486 Roll Marking and Stamping Machine is fully equipped with pressure regulator, gage, air line filter and lubricator, as well as all electrical controls.

For more data circle 110 on Postpaid Card

## IMPROVED COMBINATION PIPE AND CONDUIT GAGE

The Dayton Rogers Manufacturing Co., Minneapolis 7D, Minn., now has available for free distribution an improved combination pipe and conduit gage.

This gage will calibrate sizes of pipe from  $\frac{1}{8}$  inch to  $1\frac{1}{4}$  inches, standard pipe sizes. In addition, it has a scale

for calibrating by sixteenths the size of all tubing, shafting and other round stock.

It is claimed that this can be checked with a high degree of accuracy.

The gage is made of 1020 carbon steel and features a gun metal finish with white filled in graduations.

The gage may be obtained free of charge when requested on company letterhead.

For more data circle 111 on Postpaid Card

**HAVE YOU  
CHECKED YOUR  
COUNTERSINKING  
COSTS LATELY?**

**A Severance  
CARBIDE ECONO-SINK  
WILL GIVE YOU —**

● INCREASED ACCURACY

- MORE PRODUCTION
- SMOOTHER SEATS
- LONGER CONSISTENCY OF OPERATION
- LESS DOWN-TIME
- AND A COMPLIMENT FROM THE BOSS FOR SUGGESTING THE CHANGE

Chatter-Free  
DESIGN  
Solid  
CARBIDE  
CUTTING HEADS



MAKE THE  
Switch to  
Carbide  
BEFORE IT'S  
TOO LATE

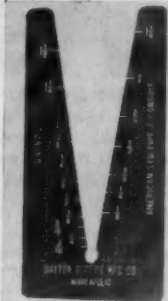
WITH THE NEW *Severance* CARBIDE ECONO-SINK  
YOU GAIN ALL THE ADVANTAGES OF CARBIDE  
TOOLING — AND AT LESS COST per Countersunk Hole

Ask for a Severance catalog today!  
Representatives and Distributors  
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**Severance TOOL INDUSTRIES INC.**  
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Dayton Rogers Pipe  
and Conduit Gage



the Finest Tools  
come from  
**GEAR PRODUCTION  
HEADQUARTERS**



**MICHIGAN TOOL**  
*Company*



7171 E. McNichols Rd. • DETROIT 19, MICHIGAN, U.S.A.



**new shop equipment . . .**

### **MULTIPLE SPINDLE DRILL HEAD**

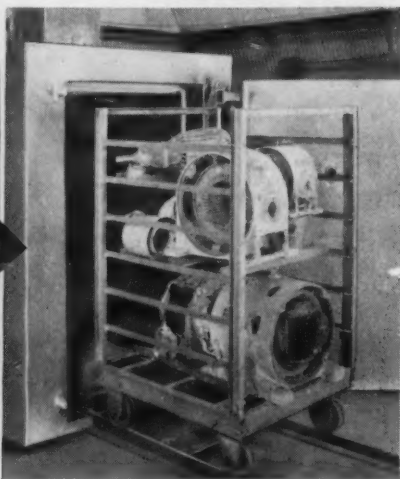
The Model 400 Multi-Drill, recently announced by the Commander Manufacturing Co., 4224 West Kinzie St., Chicago 24, Ill., is a compactly built, gear driven multiple spindle drill head which can be mounted on any drill press to permit drilling from two to

four holes at one stroke. Designed to meet applications where up to four holes are to be drilled or tapped at one time, the Model 400 is an economically priced unit built for high production work. Capacity of this drill head is  $\frac{1}{4}$  inch in mild steel. Collet capacity on other materials is  $\frac{3}{8}$  inch.

The adjustable spindles of the Multi-Drill are driven by a simple and rugged gear drive to provide extremely

efficient operation. Each spindle rotates from a fixed position and is adjustable to reach  $3\frac{3}{8}$  inch maximum bolt circle. Minimum center distances vary from  $\frac{7}{8}$  inch for the two spindle unit to 1 inch for the three and four spindle units.

Compact design and relatively light weight of the Multi-Drill permit its use on self-contained drill units. The



- REDUCE REBUILDING TIME
- IMPROVE STRIPPING RESULTS
- CUT LABOR COSTS
- STRIP ONCE A DAY—NOT ALL DAY!

**BURN OFF** old motor armature and field coil windings and insulation quickly, completely, the up-to-date way in a Despatch Burn-Off Oven. When the parts cool the windings can be removed by hand from the clean slots.

**DESPATCH BURN-OFF OVENS**, designed in cooperation with motor manufacturers, offer controlled temperature buildup . . . positive air circulation . . . uniform temperature . . . controlled cooling—all combined to guarantee complete insulation burn-off. Specify Despatch for easiest winding removal with complete protection against damage to treated motor parts. RCS-5 Oven: 24" x 36" x 48"; RCS-6: 48" x 60" x 66". Gas fired.



WRITE FOR RCS BULLETIN  
**DESPATCH OVEN COMPANY**  
381 Despatch Bldg., Minneapolis 14, Minn.

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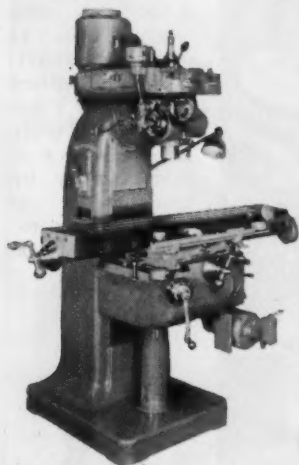
**Commander Model 400 Multi-Drill**

Produce **MORE...**

Produce it **BETTER!**

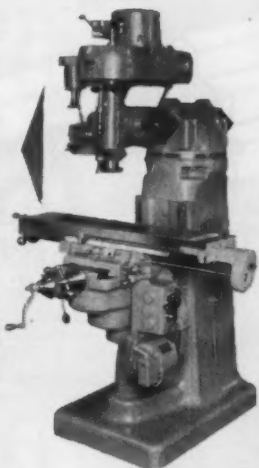
## ON THESE IMPROVED ECONOMICAL INDEX VERTICAL MILLS

*Super*  
**"55" MILL**



1½ HP Head or optional 2 HP with continuous duty motor gives 50% or more capacity . . . More rigidity, more accuracy . . . Increased horse power and dynamically balanced Cast Iron Pulleys and Drive System afford improved production capacity . . . More weight in the column, heavier ribbed column, heavier knee, heavier saddle.

**"45" MILL**



Unique square design of overarm affords more rigidity, greater accuracy . . . Provides extra range and capacity . . . More power at the cutter. No adjustment required on overarm and head after use . . . No need to re-indicate head after moving overarm . . . Speed range with nine changes makes possible the use of high speed or carbide tipped cutters to best advantage.

# INDEX MACHINE CO.

544 N. MECHANIC STREET

JACKSON, MICHIGAN

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December, 1957

modern machine shop 239

**new shop equipment . . .**

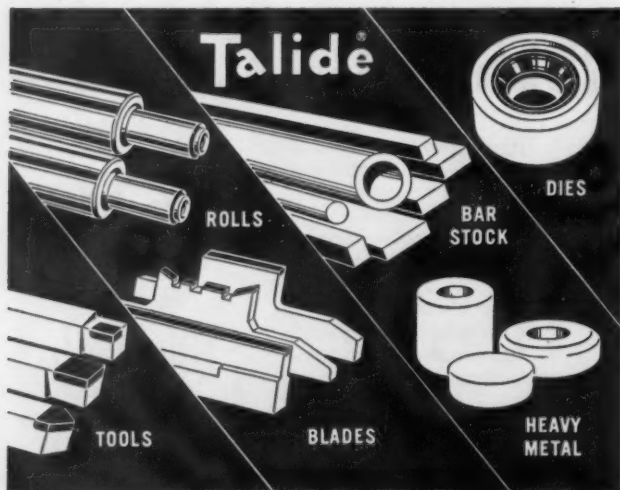
compact design and rigidity of the Commander Model 400 Multiple Spindle Drill Head is claimed to eliminate the necessity for guides when it is adapted to these units, permitting easy setups of a number of drill units around a workpiece.

For more data circle 112 on Postpaid Card

**ULTRA-PRECISION  
MEASURING MICROSCOPE**

The Leitz Microscope of ultra measurement accuracy for the electronic and instrument field has been placed on the market by Opto-Metric Tools, Inc., 137 MM Varick St., New York 13, N. Y. It is claimed that this instrument will perform measurements on miniature parts to a higher degree of accuracy than has been customary

heretofore. To make this possible, the microscope uses a 200x magnification with an optical micrometer reading in 0.00005 inch increments, in which 0.00001 inch can be safely and easily estimated. A 400x magnification is optionally available with direct reading in 0.000025 inch. Measurements may be taken in "x" or "y" axis, by rotating ocular 90



**HARDEST MAN-MADE METAL!**

• New, improved TALIDE METAL is uniform in quality—gives top performance on ALL cutting, drawing and wear-resistant applications. Write for Catalog 56-G, METAL CARBIDES CORP., Youngstown 12, Ohio.



**Leitz Microscope**

For more data circle 483 on Postpaid Card

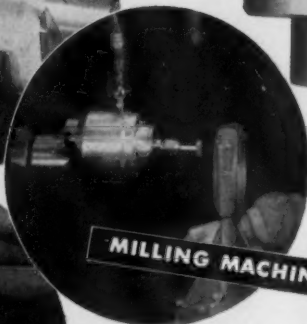
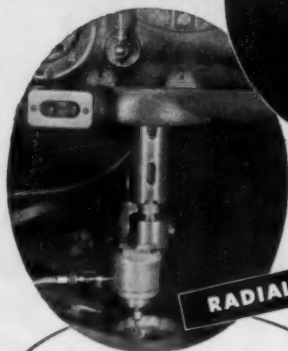
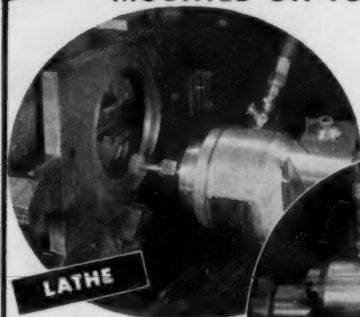
**REDUCE**  
Precision Hole Grinding Costs  
**USING AN**

**Onsrud®**

**D1-S**

**HOLE GRINDER**

**MOUNTED ON YOUR**



**OR MOUNT ON JIG BORER  
TO CONVERT MACHINE  
TO PRECISION  
JIG GRINDER**



Grind precision holes at amazingly low costs with the D1-S . . . using your present machine tools. A completely RIGID unit guaranteed not to deflect in its vertical alignment. Grease-shielded, long life bearings. Capacity up to 2 3/4" diameter with 3/4" wheel . . . and up to 4" diameter with adapter. Proper high speed and power for dependable, fast operation with toughest steels.

**ONSRUD MACHINE WORKS, INC.**  
PORTABLE TOOL DIVISION  
3924 PALMER ST., CHICAGO 47, ILL.

**WRITE FOR FREE D1-S HOLE GRINDER BULLETIN 1126**

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**new shop equipment . . .**

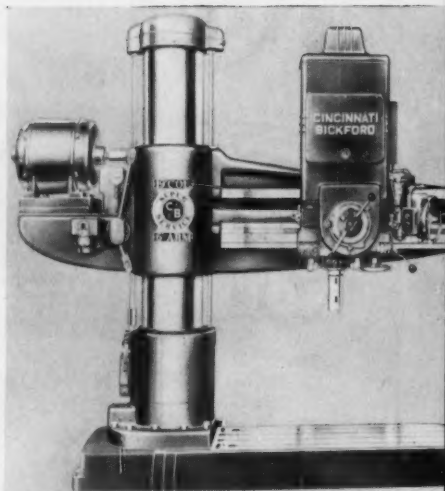
degrees against a stop. Built in vertical illumination is standard equipment, but understage illumination through a stage glass in the measuring stage can be provided.

For more data circle 113 on Postpaid Card

★ ★ ★

**RADIAL DRILLING MACHINE  
WITH ALL NEW HEADS**

Super Service Radial Drilling Machines, now being offered with three newly designed heads, incorporate many advanced construction and operating features that permit fast, safe operation and unusual machining accuracy, according to the manufacturer, the Cincinnati Bickford Division, Giddings and Lewis Machine Tool Company, Oakley, Cincinnati 9, Ohio.



*Cincinnati Bickford Radial Drilling Machine*

The three optional head designs, with 100 per cent centralized operation

★ ★ ★ ★ ★

**GAGE  
HANDLES  
and BLANKS**

available for  
immediate  
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Also available  
Trilock and Spline  
Gage Handles

A. G. D.  
Standards



Single End Go  
Reversible  
Gage Handle



Taperlock  
Gage Handle

Double End Reversible  
Gage Handle



Established 1938

**Royal Oak Products Co.**

28282 John R St. (P.O. Box 161) Royal Oak, Michigan

Phone Lincoln 2-1780

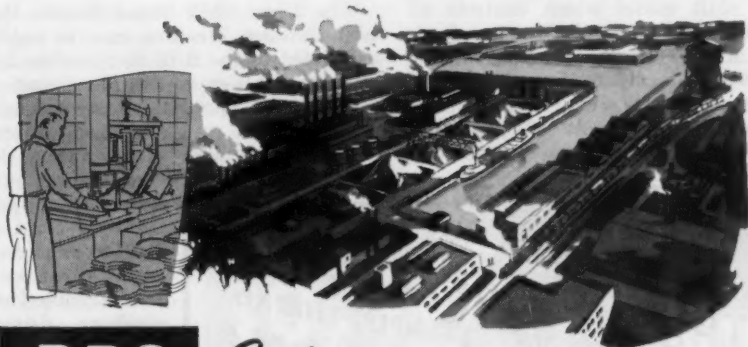
manufacturers of gage handles and blanks

Write for Catalog

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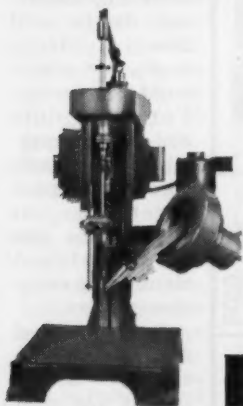
# Industrial GIANT or One-Man Shop



**DPS**

*Engineers* CAN SOLVE YOUR  
**ASSEMBLY PROBLEM!**

● For assembling operations large or small, intricate or simple, we are prepared to take care of your requirements. If you have a feeding or assembling problem, though seemingly difficult, don't hesitate. Write today, send sample assembly, give details.



**POWER SCREWDRIVERS**  
5 Machines  
Bench and Pedestal Types

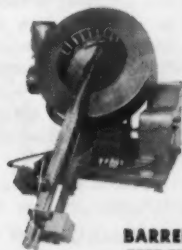
**DPS**

**DPS**

**All-Purpose SELECTIVE  
PARTS FEEDERS**



**BOWL FEEDER**  
for light, fragile parts. Operates on vibratory principle. Fully automatic.



**BARREL FEEDER**  
conventional motorized type, for parts requiring critical selection.

**DETROIT  
POWER  
SCREWDRIVER CO.**

2807 W. FORT STREET • DETROIT 16, MICHIGAN  
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**Write Today for  
LITERATURE!**

December, 1957

modern machine shop 243

## new shop equipment . . .

ing controls, include: (1) Standard lever shift model which controls all 36 spindle speeds and 18 power feeds manually. (2) Partial preselect model which provides hydraulic control of all 36 spindle speeds with manual control of the 18 power feeds. (3) Complete preselect model which hydraulically

changes all 36 spindle speeds and 18 power feeds, controlled by two easy to read dials which are positioned low and logically located one on each side of the head.

The Lever Shift Super Service Radial Drilling Machine can be easily converted in the field to complete hydraulic preselect system for control of both spindle speeds and power feeds, or hydraulic preselection of speeds only. Other modern operating and design features built

into the Super Service Radial Drilling Machines are as follows. Declutchable Herringbone driving gear, which provides the necessary power to drive large diameter drills and heavy cutting tools for maximum penetration. For small drills and taps requiring high spindle speeds and quick reversals, the Herringbone gear is declutched, eliminating excessive velocity.

A preloaded, four bearing, chrome nickel spindle and chromium plated spindle sleeve are supported in a honed head bore over 17 inches long, assuring maximum rigidity regardless of spindle position.

Both the arm and the column



**STOPS  
PIPE THREAD  
LEAKS**

PAT. PENDING

**Satisfaction Guaranteed Or Money Back TRIAL OFFER**

TRU-O-SEAL Fittings are guaranteed to seal pipe thread connections permanently against all oils, practically all known chemicals and gases; to seal under high pressures or vacuum; to withstand —280° to plus 500° F.; to eliminate "overtightening" damage and pipe dope. Available in 1/8" to 2 1/2" pipe thread sizes.

**\$10.00 Trial Offer No. 1:** eight 1/8", ten 1/4", eight 3/8", ten 1/2" pipe thread TRU-O-SEAL Fittings.

**\$10.00 Trial Offer No. 2:** eight 1/2", ten 3/4", four 1" pipe thread TRU-O-SEAL Fittings.

Send order to

**TRU-O-SEAL DIVISION**  
Flick-Reedy Corp  
2024 N. Hawthorne, Melrose Park, Ill.

"Miller Fluid Power" is also a Div. of Flick-Reedy Corp.

**1**

Thread TRU-O-SEAL on pipe or fitting (no messy pipe "dope" needed).



**2**

Thread pipe or fitting 4 threads into part. Point in desired direction.



**3**

Tighten TRU-O-SEAL to complete leakproof assembly (only light torque required).



**SEAL SIDE**



For more data circle 487 on Postpaid Card

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1957

are clamped hydraulically from the operating position. Special separate motors and complicated electrical controls are eliminated.

The head moves swiftly along the arm in either direction with power rapid traverse, operated by a directional lever which automatically disengages the traversing handwheel when traversing under power. A disc type clutch provides safety at any point of head travel on the arm, eliminating the necessity of limit switches.

Two sealed beam work lights, one on each side of the spindle, are said to be impervious to damage from chips and coolant.

The Cincinnati Bickford Super Service Radial Drilling Machines are available in 13, 15, 17 and 19 inch diameter columns; 4, 5, 6, 7 and 8 foot arm lengths; 36 spindle speeds up to 2,300 r.p.m.; 18 power feeds from 0.004 to 0.125 inch with six positive geared tap leads. For more data circle 114 on Postpaid Card

★ ★ ★

### DOUBLE END BORING BAR

A double end boring bar, encased with Kennametal hard tungsten carbide to reduce chatter and reduce the



*Kennametal Double End Boring Bar*

cost of precision boring, has been announced by Kennametal, Inc., Latrobe, Pa. This double end boring bar is being made in a range of sizes for machine shop use. The bar illustrated has a 1 1/4 inch square cross section

Up To  
**10,000** psi Oil  
from  
**Shop Air!**

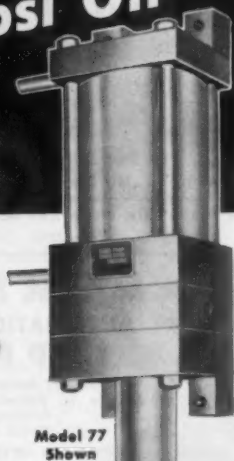


AIR TO  
HYDRAULIC

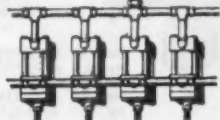
## BOOSTERS

**No Pumps or High Pressure  
Valving Needed**

Hook a Miller Air-Hydraulic Booster to your air line and get INTENSIFIED (ratios up to 100 to 1) Hydraulic Power that you can vary and control at will and use for such common shop operations as punching, clamping, pressing, riveting, shearing, welding, crimping, testing, etc. High pressure booster output drives the hydraulic work cylinders and can be directly applied (without cylinders) in testing, measuring, other applications. Boosters save air, space, weight, require little or no maintenance, and hold pressure as long as desired without additional power consumption. Models for immediate delivery.



**Model 77  
Shown**



**Write For  
Full Details**



**FLUID POWER DIVISION**

*Flick Reedy Corp.*

2024 N. Hawthorne • Melrose Park, Ill.

For more data circle 488 on Postpaid Card

## new shop equipment . . .

and is about 14 inches long. The inset cross section shows the proportion of Kennametal to steel.

Kendex type clamping mechanisms are recessed in each end of the bar to hold the chipbreaker, insert and seat, all made of Kennametal. Two different

types of Kendex indexable inserts, namely triangular and square, are used on the ends of the boring bar. For more data circle 115 on Postpaid Card

★ ★ ★


## VALVE WITH LOCKING MANUAL ACTUATOR

Ross Operating Valve Co., 139 East Golden Gate Ave., Detroit 3, Mich., has announced the latest addition to its Skyline Series of valves; namely, a Goldmodel Valve with locking manual actuator which is O ring sealed.

This large capacity pilot section is actuated by an extremely long life, oil immersed solenoid. Built to J.I.C. standards, the valve has been designed to spring return to normal operation or to be easily locked in the actuated position. A 90 degree turn of the actuator will lock the solenoid in the energized position.

With a tested life of more than 40 million cycles, the Goldmodel with locking manual actuator joins the Skyline Series, which includes the Silvermodel J.I.C. spool solenoid, the Whitemodel spool solenoid and three Blue-model pilot heads. All of these pilot heads are interchangeable on seven Ross Valve Bodies.

These valve bodies include: straight way, normally open and normally closed; three way, normally open and normally closed; in the in-line series;



**The Leading Machine Tool Manufacturers**

USE

**RUTHMAN GUSHER**

**COOLANT PUMPS**

Model  
UL 7120

**THE RUTHMAN MACHINE CO.**  
1817 Reading Rd., Cincinnati 2, Ohio

For more data circle 489 on Postpaid Card



**DORMAN**

**AUTOMATIC REVERSE TAPPERS**

- Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY.

**No. 1A FRICTION DRIVE TAPPER** — capacity No. 2-56 to 3/8" in Steel — 1/2" in Aluminum.

**No. 2B POSITIVE TAPPER**—capacity 3/8" to 7/8" in Steel.

**No. 3A POSITIVE TAPPER**—capacity 1/2" to 1 1/4" in Steel—1/2" to 3/4" Pipe Taps.

**No. 4A TAPPER** — capacity 3/4" to 2" in Steel including Pipe Taps.

- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

Priced from \$62.00

Write for Bulletin

**IMMEDIATE DELIVERY**

**THRIFTMASTER PRODUCTS CORPORATION**  
Division of Thomson Industries, Inc.  
1034 N. PLUM STREET, LANCASTER, PA.  
STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

For more data circle 490 on Postpaid Card



**DRILL THESE HOLES**

**BY A QUICK, EASY, INEXPENSIVE METHOD**

Your business letterhead will bring literature.

**WATTS BROS. TOOL WORKS**  
Wilmerding, Pa.

For more data circle 491 on Postpaid Card

Appliance Maker  
Reports—

## 1-ton DENISON MULTIPRESS doubles output of small assemblies



Every ten seconds, a 5-part brush holder assembly is turned out with a single fast ram stroke of the Denison 1-ton hydraulic Multipress.

**Problem:** How to cut production costs and scrap loss — yet maintain uniformity on assembling small motor brush holders. That's what faced The Master Appliance Company, Racine, Wisconsin, who had been doing the work with 3 workers operating 3 kick presses.

**Solution:** They installed a Denison 1-ton hydraulic Multipress —equipped it with an 8-station air index table. Assembly components consisting of two terminals, two brush holders and a dielectric plate are hand-loaded on the fixture. The Multipress then assembles all five parts with one quick hydraulic ram stroke every ten seconds. Assemblies are uniform because the ram exerts an identical pre-set pressure on every stroke.

**Results:** Production doubled...a final inspection step for loose parts eliminated...scrap loss cut. One machine, the Multipress, replaced 3 kick presses.

### DENISON ENGINEERING DIVISION

American Brake Shoe Co.  
1254 Dublin Road, Columbus 16, Ohio

Manufacturers...  
**Free 30 day trial**

Try the Denison 1-ton hydraulic MULTIPRESS in your plant at no cost or obligation! Write us for details.

Denison, Denison HydrOILics, and Multipress are registered trademarks of Denison Eng. Div., ABSCO



HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

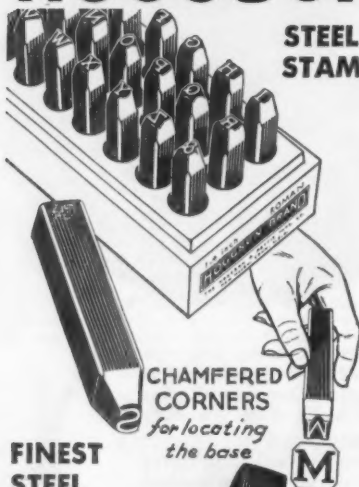
For more data circle 492 on Postpaid Card



TO BE SURE OF  
QUALITY  
Remember  
the Name

# HOGGSON

**STEEL  
STAMPS**



CHAMFERED  
CORNERS  
*for locating  
the base*

**FINEST  
STEEL**

*long  
life*



ALSO IN  
REVERSE  
FOR  
MOLDS  
& DIES

Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

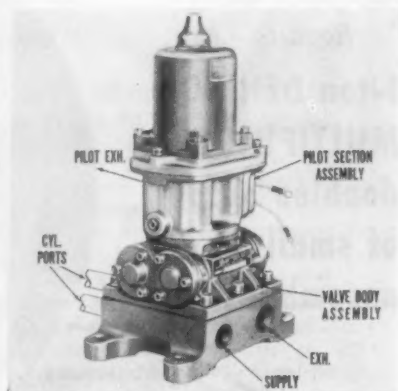
**HOGGSON & PETTIS MFG. CO.**

New Haven 7, Connecticut

For more data circle 493 on Postpaid Card

248 modern machine shop

*new shop equipment . . .*



*Ross Valve with locking manual actuator*

and three way; and four way; in the base mounted series.

For more data circle 116 on Postpaid Card

★ ★ ★

## **MULTI-RANGE, MULTI-PURPOSE TORQUE WRENCH**

The P. A. Sturtevant Co., Addison, Ill., has announced a completely new approach to high torque application requirements. Now, by using a conventional lightweight, small size and low

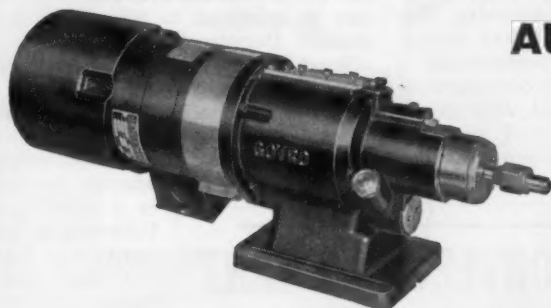


*Sturtevant Multi-Range Torque Wrench*

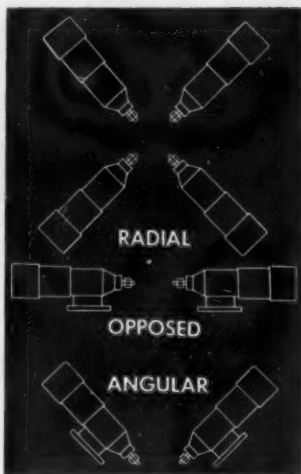
December, 1957



# BUILD YOUR OWN



## AUTOMATIC DRILLING OR TAPPING MACHINE



With Govro-Nelson Automatic Drilling and Tapping Units, together with the bases and electrical controls which we can supply, you can build yourself an automatic drilling or tapping machine at substantially lower cost than a special machine.

Any number of units may be employed. Examples of the various ways in which they may be arranged are shown at the left.

The Drilling Units are made in several sizes with spindle speeds from 1100 to 3450 RPM. Drill Units have full Hydraulic Control with external adjustment for the rapid approach, the rate of feed and the length of stroke. Suitable for drills up to  $\frac{3}{8}$ ", depending on material.

The Tapping Units are available in two sizes with 550 and 1725 RPM spindle speed. Features include no clutch and no lead screw and automatic adjustment for various leads. Suitable for tapping 0-80 to  $\frac{3}{8}$ -16, depending on material.

**Write for Literature**

**GOVRO-NELSON CO.**

*Machinists of Precision Parts for 34 Years*

**1933 Antoinette  
Detroit 8, Mich.**

*Automatic* **DRILLING UNIT**

For more data circle 494 on Postpaid Card

## new shop equipment . . .

capacity torque wrench, a new series of adapters enables increasing the range of the conventional torque wrench as high as 900 foot-pounds.

A number of versatile combinations are available as standard stock items. A normal 150 foot-pound capacity torque wrench can be increased for ap-

plications as high as 300 foot-pounds. A normal 200 foot-pound torque wrench can be increased for capacities as high as 400 foot-pounds. A normal 300 foot-pound capacity torque wrench can be increased to 600 or 900 foot-pounds. Because the torque wrenches offered have pivoted handles, concentrating the load position, they may be used for extremely accurate applications with these multi-range, multi-purpose adapters. The torque wrench

adapter accessory is a heavy duty, lightweight, conventional hand tool that enables using box end openings, ratchet end or a conventional drive square so that sockets can be used. Each of these adapter end accessories may be interchanged and yet maintains the proper lever length of the adapter. A wide range of box end openings is available from  $\frac{3}{4}$  inch to  $2\frac{1}{2}$  inches.

For more data circle 117 on Postpaid Card

★ ★ ★

## SELECTIVE FLAME HEAT- ING MACHINE

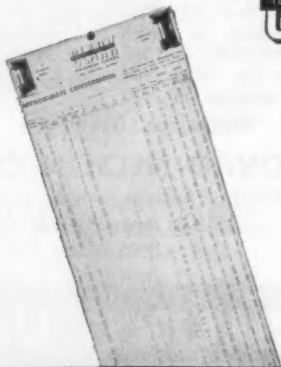
A Flamatic Selective Flame Heating Machine has recently been introduced by the Process Machinery Division,

## HARDNESS CONVERSION CHART

### For Every Shop That Does Hardness Testing

This latest and most nearly accurate Hardness Conversion Chart is a necessity wherever hardness testing is done. It has been compiled and produced by CLARK, makers of the internationally respected CLARK Hardness Tester for "Rockwell Testing." Printed on heavy stock convenient for wall mounting, the chart is offered free of charge to hardness tester users. Just attach this ad to your letterhead or write "Send wall chart." A copy will be mailed to you without charge or obligation.

P.S. If you would also like information on CLARK Standard and Superficial Hardness Testers, we'll be glad to send that along too.



**CLARK**  
TOMORROW'S ADVANCE TODAY

**CLARK  
INSTRUMENT  
INC.**

10204 Ford Road  
Dearborn, Mich.  
U.S.A.

For more data circle 495 on Postpaid Card

Buy blocks  
with a  
"Built-in"  
Wear  
Factor!



**ELLSTROM CHROMIUM PLATED GAGE BLOCKS**  
are guaranteed "minus nothing" from nominal size!

Here at last are gage blocks with a positive "built-in" wear factor! The only blocks ever produced and priced as standard with dimensional accuracy unconditionally guaranteed to be within specified millionths on the "plus" side of nominal block size and minus "zero" . . . absolutely nothing . . . undersize!

This complete elimination of the conventional minus tolerance gives you, the gage block user, three new and exclusive benefits. First, it provides positive assurance against receiving new blocks

that are actually "worn" undersize during manufacture before they are ever used. Second, it gives you finer, more practical accuracy . . . with the sure knowledge that every Ellstrom block you buy will start wearing toward its nominal size rather than away from it. And third, it gives you a guaranteed minimum wear factor equivalent in millionths to the full minus tolerance specified as standard for all other makes of blocks!

Write for descriptive literature containing complete price information today!

ELLSTROM  
STANDARDS  
DIVISION



**DEARBORN GAGE COMPANY**

"Measuring in Millionths for Three Generations"

22038 Beech Street • Dearborn, Michigan

REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE UNITED STATES AND CANADA  
For more data circle 496 on Postpaid Card

### **new shop equipment . . .**

The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. The machine embodies the building block principle of construction to provide a high degree of flexibility for a wide variety of flame heating applications. Flamatic Machines have been designed for heat processing applications requiring high or low heating capacity, selective application of heat, precise temperature control and automatic operation.

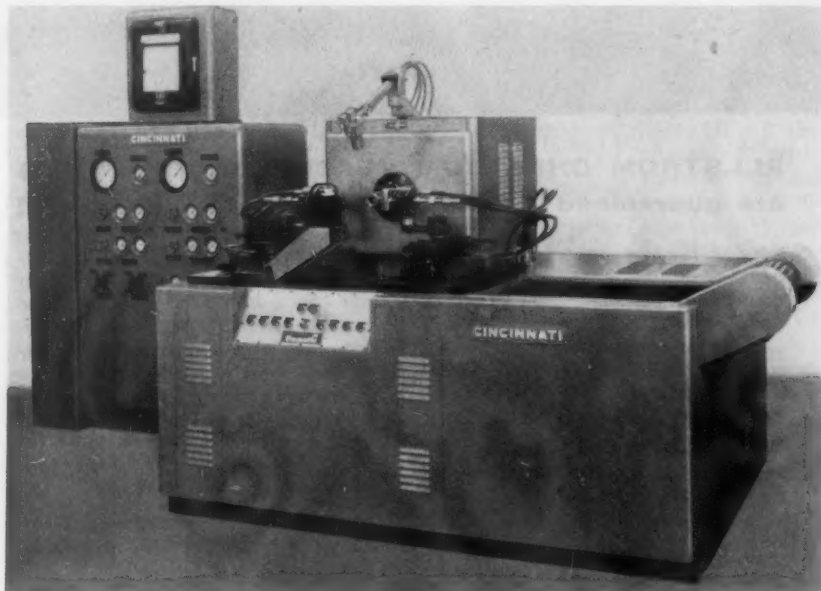
The basic element of the Flamatic is a base unit of functional, flat bed design which acts as the supporting member for a wide variety of workholding and handling fixtures and flame heads. The base houses a large volume quench tank with high capacity heat exchanger, automatic quench

agitation system and a large work removal conveyor which can be timed to work continuously or intermittently with each heating cycle, permitting delivery to be integrated with plant conveyor systems.

The rear portion of the base houses a mechanical controls compartment for workhandling fixtures. The upper portion of the base is provided with mounting surfaces for workholding fixtures and flame heads. Pushbutton controls for all machine functions are conveniently located on a control panel on the front of the base.

A control unit, housed in a separate cabinet, provides accurate control of gas, oxygen, air and water. Fuel gases employed may be acetylene, butane, propane, natural or manufactured gas.

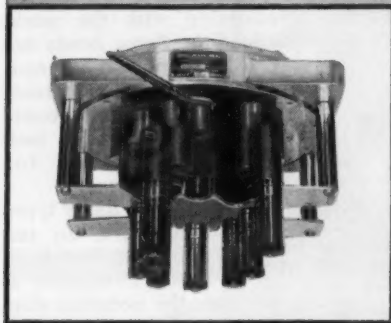
A separate rotating spindle work unit is available to simplify the proc-



**Cincinnati Selective Flame Heating Machine embodies building block construction**

# **FAST Precision SET-UPS**

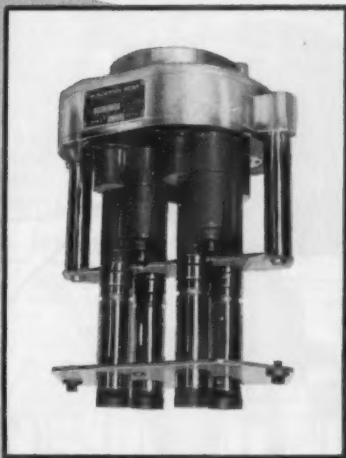
**that "Stay Put" because they are  
Secured by Locked Templates\***



★ This exclusive patented feature, found only in Wisconsin Adjustable Drill Heads, assures accurate set-ups.

**1.** Positioning template for primary adjusting is placed on the support posts. Using a spanner wrench as shown, the spindles are quickly swung into position, locating in the half-holes, which are accurately jig-bored for the required hole pattern.

**2.** The locking template . . . with full holes bored to match . . . is then slipped over the spindles. Then both plates are secured to the support posts, and individual spindle lock-nuts are tightened to lock each spindle.



*Wisconsin builds Adjustable and Fixed Spindle Drill Heads and Tapping Heads, Lead Screw Tapping Units, Special Machines, Fixtures, Fixture Bases and Index Tables.*

*Write for New Complete Catalog.*



**WISCONSIN DRILL HEAD CO.**

4983 N. 124TH STREET • BUTLER, WISCONSIN

For more data circle 497 on Postpaid Card

**new shop equipment . . .**

essing of the large volume of gears, pinions, shafts, cams and other parts that are best handled by rotating them during the heating cycle. Spindle speeds are infinitely variable from 15 to 375 r.p.m. Automatic spindle retraction of 10 inches maximum at the end

of the heating cycle instantly drops the workpiece into the quench tank, which is located below.

Rhomboid type flame heads with removable tips are normally employed in conjunction with the rotating spindle work unit. Flame heads are carried in a universal type mount embodying three swivel movements, simplifying the positioning to any desired angular relationship with the work. To facilitate loading, flame heads are mounted on pneumatically actuated sliding mounts having a 4 inch retraction for each head.

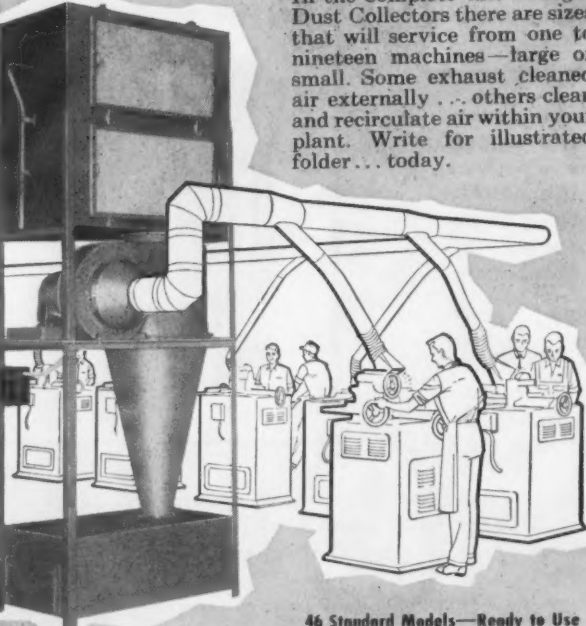
For many types of work, an important feature of the Flamatic is the accurate electronic temperature control which automatically terminates the heating cycle and causes the workpiece to be dropped into the quench tank when its surface temperature reaches the desired preset value. The brain, which directs this highly accurate control of temperature, is a remotely mounted electronic radiation pyrometer embodying a sensing element which is said to accurately measure the surface radiation of the workpiece.

**just ONE**

**DUSTKOP**  
STOPS DUST

**heavy duty unit services up to 19 MACHINES**

In the complete line of Agnet Dust Collectors there are sizes that will service from one to nineteen machines—large or small. Some exhaust cleaned air externally . . . others clean and recirculate air within your plant. Write for illustrated folder . . . today.

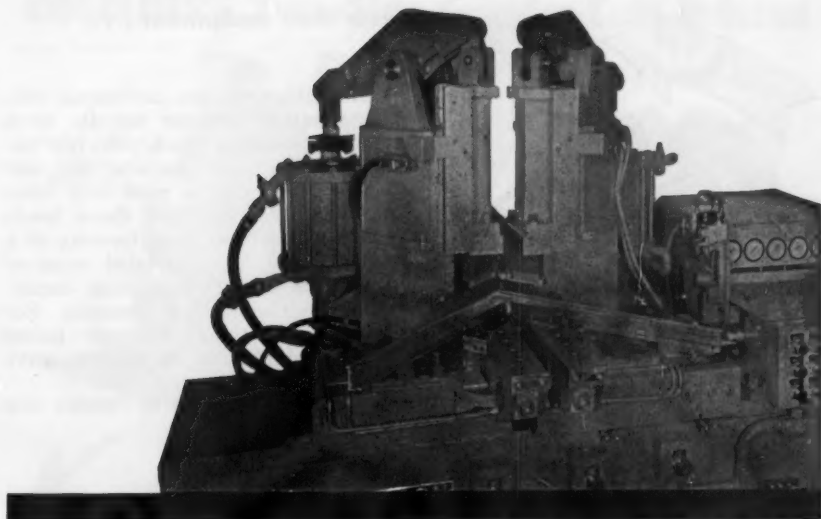


46 Standard Models—Ready to Use

**AGET manufacturing company**  
1398 Church Street • Adrian, Michigan

For more data circle 498 on Postpaid Card





## PRK • 33 TOOL STEEL

(Cobalt, High Carbon, High Chrome)

\*Holds its edge at 1000° F.!

Above is the Thomson Synchro-Matic Flash Welder performing a miter weld on an aluminum window extrusion. "Pinch-off" dies of PRK-33, a Thomson development, support the work close to the point of weld. After welding, this PRK-33 die moves in to pinch off the flash close to the surface of the work. Eliminates most cleaning and finishing of the weld.

After testing many die steels, Thomson now specifies PRK-33. They have found PRK-33 to be the finest high carbon, high chrome, with cobalt, die steel available. Its production record, its ability to hold a hard edge at high temperatures far surpassed all other die steels tested. Heat treated and double drawn at 980° F. gives PRK-33 a secondary hardness of 59-61 Rc.

*Complete Line* of highest grade Tool Steels, including PRK-33, DARWIN No. 1, NEOR, MINEOR, OHT, "MT6" and various grades of Hot Work Specialty Steels. Furnished in Bar Stock, Forgings, and Sand Castings, Drill Rod, Flat Ground Stock and Tool Bits.

*Bulletin on Request.*

Want these qualities in the dies you buy?

Write for full information NOW!

## DARWIN & MILNER Inc.

*highest grade tool steels*

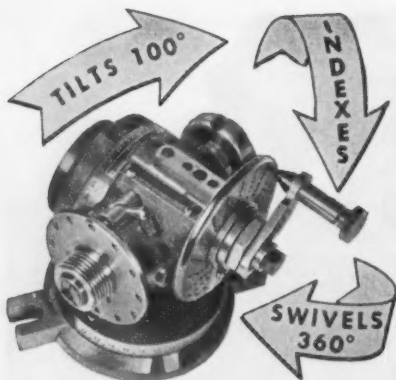
2345 ST. CLAIR AVENUE ★ CLEVELAND 14, OHIO

• 1410 W. FIRST AVENUE • COLUMBUS, OHIO •

REPRESENTED BY

ZIV STEEL & WIRE CO., CHICAGO • DETROIT • ST. LOUIS • INDIANAPOLIS • TOLEDO • MILWAUKEE  
• M. G. OPP COMPANY, NEW YORK CITY • PECK STEEL & DIE SUPPLY COMPANY, LOS ANGELES •  
CHARLES B. WEBSTER, PLAINVILLE, CONNECTICUT • CHARLES W. BRINGMAN, ORLANDO, FLORIDA

For more data circle 499 on Postpaid Card



FOR FASTER PRODUCTION

## THE ELLIS DIVIDING HEAD

Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

**N**  
NICHOLS MORRIS  
**M**  
CORPORATION

76-H MAMARONECK AVE.

WHITE PLAINS, N. Y.

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256 modern machine shop

### new shop equipment . . .

In addition to spin hardening, with the standard rotating spindle work unit, the building block principle enables the standard machine base and control cabinet to be used with other workhandling units and flame heads to provide efficient heat treating of a wide variety of non-related types of work such as spot hardening, combination hardening and brazing. For many applications, a single power control cabinet can be used to serve several work processing units.

For more data circle 118 on Postpaid Card

★ ★ ★

### PORTABLE SAW

Peerless Machine Co., Racine, Wis., has introduced its Handi-Cut Portable Saw. It has been designed for use at the bench in the shop, on contact jobs in the field or in the workshop.

It is portable and flexible enough for cutting any size metals up to 4 by



Peerless Handi-Cut 4 by 4 inch Portable Saw

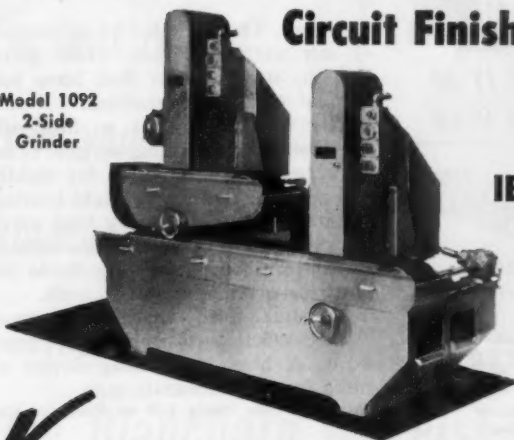
December, 1957

# ENGELBERG Two-Side Grinder Cuts Printed Circuit Finishing Time by

# 93% for

## IBM SAGE Computers!

Model 1092  
2-Side  
Grinder



✓ An Engelberg conveyor-type abrasive belt grinder has multiplied production by sixteen — and virtually eliminated rejects — on a finishing operation at the Kingston, N. Y. plant (Military Products Division) of International Business Machines Corp.

Here the I.B.M. SAGE Computer is produced for the U.S. Air Force. To produce printed circuits for this computer, perforated phenolic sheets are copper clad on both sides, then coated with graphite. Excess graphite remaining on the two surfaces must then be removed.

Previously, the sheets were sanded under water by a pneumatic, oscillating hand sander. Sixteen man-hours were required to meet daily production.

Using a 240-grit belt, the Engelberg Model 1092 (described at right) removes .0001" on one pass . . . flips the sheet . . . removes .0001" from the other surface . . . all in a single cycle. The graphite coating remains only to coat the walls of the holes pierced in the part.



The Original Operation



Solution to IBM'S Problem:  
The Model 1092 Two-Side  
Grinder

This high-production, semi-automatic abrasive belt machine gives precision finishing to close tolerances on both flat surfaces of any ferrous, nonferrous, plastic or other materials. Piece-work first passes under grinding head at left, then is carried around to bottom conveyor belt with unground face up, positioned for passage under second grinding head at right.

For complete information on this and other Engelberg Abrasive Belt Grinders consult your Sweet's Catalog or write . . .

# ENGELBERG

The ENGLEBERG-HULLER Co., Inc.  
1012 Seneca St., Syracuse, N. Y.

## PRECISION ABRASIVE-BELT GRINDERS

For more data circle 501 on Postpaid Card

December, 1957

modern machine shop 257



#### VERTICAL

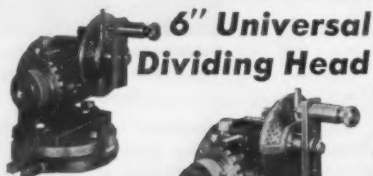
At last, a top quality industrial sander that provides all the most wanted features - yet sells for so little. **\$89.95** complete with cord, plug, switch ready to use

Illustrated Literature on Request  
A few desirable distributor territories still available.

### WALLS SALES CORPORATION

333 Nassau Avenue Brooklyn 22, N. Y.

For more data circle 502 on Postpaid Card



with

#### DIRECT INDEXING

Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

Write for Catalog

### CARROLL DIVIDING HEAD CO.

3525 Cardiff Ave. Cincinnati, Ohio

For more data circle 503 on Postpaid Card

258 modern machine shop

### new shop equipment . . .

4 inches. The Handi-Cut is claimed to saw extremely fast, while giving smooth, straight cuts that have subsequent machine operations.

The Handi-Cut has a fabricated steel base, built for long service. It has a rugged cast saw frame for rigidity and accurate cutting. Oil light bearings are provided at all heavy load carrying points. This portable saw features a cast iron swivel and adjustable vise jaws for a wide range of work.

Adjustable feeds provide for unusual sawing efficiency on light or heavy work. A blade tensioning device assures fast and accurate cuts.

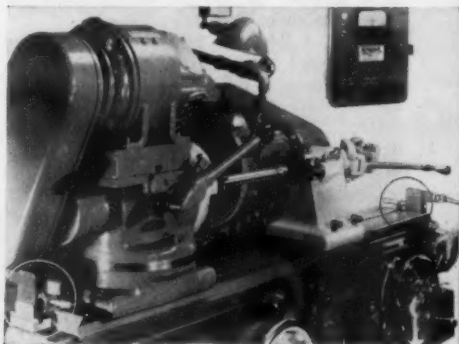
For more data circle 119 on Postpaid Card

★ ★ ★

### GAGE SPEEDS GRINDER OUTPUT

A work positioning gage, called the Sure-Set, has been announced by Federal Products Corp., 71410 Eddy St., Providence 1, Rhode Island.

This gage applies a new idea to positioning of the swivel table on universal type grinders so that the operator can produce work of desired straight-



Federal Sure-Set Work Positioning Gage

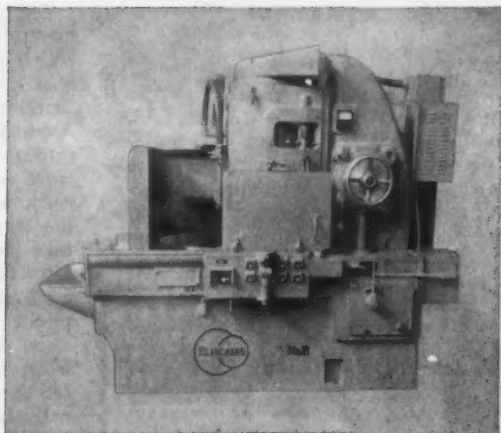
December, 1957

*For best results*

*from your*

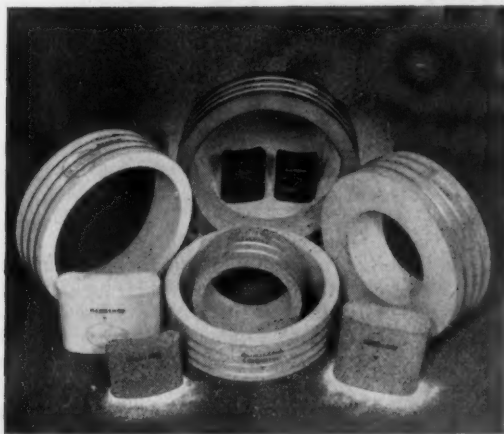
**Blanchard**

**Surface Grinder**



BLANCHARD NO. 10 SURFACE GRINDER

**Use Blanchard Wheels!**



Blanchard specializes in the manufacture of segments and cylinder wheels for Blanchard and other Vertical Spindle Surface Grinders. If you have a difficult grinding job, whatever the material may be, or if you are not satisfied with the results you are now getting, let us help you.

Blanchard wheels are the quality wheels for Blanchard Grinding. Use them to get maximum performance from your Blanchard!

**PUT IT ON THE**



Please send me a free copy of "The Art of Blanchard Surface Grinding" (3rd Edition).

**THE BLANCHARD MACHINE COMPANY**

64 STATE STREET, CAMBRIDGE 39, MASSACHUSETTS  
For more data circle 504 on Postpaid Card

December, 1957

modern machine shop 259

## new shop equipment . . .

ness, cylindrical or tapered, without any need for charts, correction tables, mathematics or repeated trial and error grinding. The Sure-Set can be used successfully with any make of universal grinder of reasonably good capability and on a swivel table of any length.

### BRUSH TOP CANS

**For Layout Blue!**



HANDY, ELLISCO BRUSH TOP CANS MAKE IT EASIER FOR YOU TO APPLY AND STORE LAYOUT BLUE. BRUSH KEEPS MOIST IN CAN. CONTENTS WON'T DRY OUT 3 OZ. TO 1 QT. CAPACITIES. GET DETAILS AND BULLETIN NO. 60A.

**George D. Ellis & Sons, Inc.**

4024 N. American St., Philadelphia 40, Pa.

For more data circle 505 on Postpaid Card

### .0003 HOLE LOCATION IN 1 MINUTE

#### EDGE FINDERS

**\$2.50  
NEW**

**POSTPAID  
except C.O.D.**

**\$10.00  
DELUXE**



- THOUSANDS HAVE PROVEN and ACCEPTED THE DELUXE MODEL FOR YEARS.
- JUMPS SIDWAYS AS SHOWN WHEN LOCATION IS REACHED

← NEW .500 DIA. MODEL FOR LARGER WORK ONLY. .200 DIA. →



#### ADJUSTABLE VISE STOP

**\$2.95**



HUNDREDS OF PIECES TO A .0003 TOLERANCE WITH THIS HARDENED VISE STOP THAT IS ADJUSTABLE IN ALL DIRECTIONS.

ATTACH TO VISE WITH ONE 1/4-20 TAPPED HOLE.

Dealer Inquiries Invited

**GLOVER MFG. CO.**

422 Park Ave.

Meadville, Penna.

For more data circle 506 on Postpaid Card

260 modern machine shop

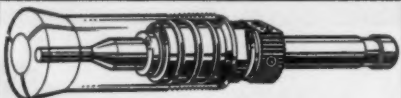
The Sure-Set incorporates two completely enclosed electronic gage heads which locate on the grinder at the ends of the table and work into a special amplifier through a selector switch. Associated with the amplifier is computing circuitry which automatically corrects for the difference between work length and table length. Using the Sure-Set, the operator need only take one set of manual measurements after his trial cut, adjust the table according to meter indication on the amplifier panel, then finish grind. This same procedure applies even when the work is long and tolerances are in tenths. Since the Sure-Set automatically takes care of the required calculations and is unusually accurate, its use saves considerable setup time, thereby increasing grinder output.

For more data circle 120 on Postpaid Card

★ ★ ★

### 3 AND 4 INCH STATIONARY DIE HEADS

Landis Machine Co., Waynesboro, Pa., recently announced the development of 3 and 4 Inch Landmatic Heat Treated Stationary Type Die Heads. For application to turret lathes and other machines employing stationary type heads, these heads have been designated as Type A and have been designed to replace the former No. 3 and 4 Inch Type Z Die Heads.



#### NEW! Self-Centering 5C Collet Stop

Quick friction adjustment. Stays in fixed position. Will not distort collet. Will not move back. Also available for other collets and spindles.

Write for Bulletin.

**BYCO INDUSTRIES**

2200 Snelling Ave.

Minneapolis 4, Minn.

For more data circle 507 on Postpaid Card

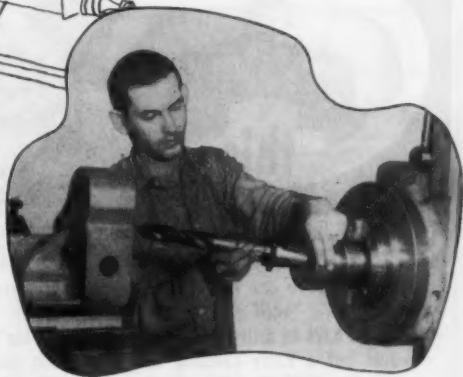
December, 1957



# WHAM and there goes spindle accuracy



Our illustrated "character" is about to ruin spindle accuracy with a hammer and drift key that cost a lot of money to get in the first place. Modern P.D.Q. tooling can eliminate this abuse ... and save time and money as well. A quick one-sixth turn of the holder nut releases the adapter and you're ready for the next operation ... it's as easy as that. How about those machine tools in *your* plant? Get the facts on P.D.Q. tooling ... Write for complete information.



*Representatives in principal cities.*



**PORTAGE Double-Quick, Inc.**

1041 SWEITZER AVENUE • AKRON 11, OHIO

For more data circle 508 on Postpaid Card

December, 1957

modern machine shop 261

## new shop equipment . . .

Standard ranges of the Type A Heads are: 3A to  $\frac{3}{4}$  inch to 3 inch U. N. C.,  $\frac{3}{4}$  to  $1\frac{1}{2}$  inch U. N. F.,  $\frac{1}{2}$  to 3 inch pipe; 4A to 1 to 4 inch U. N. C., 1 to  $1\frac{1}{2}$  U. N. F., 1 to 4 inch pipe. With oversize chaser holders, the 3 and 4 Inch A Landmatics will produce short thread lengths no coarser than

6 pitch from  $3\frac{1}{8}$  to  $5\frac{1}{2}$  and  $4\frac{1}{8}$  to  $6\frac{1}{2}$  inches in diameter, respectively.

Self-opening or pull off action is effected by interrupting the forward travel of the turret slide or carriage. Positive and uniform head opening action enables threading close to a shoulder with safety. The head is manually closed by means of a conveniently located handle.

As compared with the semi-steel construction of the former Type Z

Heads, these Landmatics are of chrom-moly alloy steel, heat treated and then ground for excellent wearing qualities. The chaser holders, previously cast, are also manufactured of an alloy steel. These features contribute to long life and threading to Class 3 tolerances.

Several improved mechanical features have been incorporated into the Type A Heads in order to provide greater operating efficiency. To evenly

**"Cuts Installation Costs 80%"**



**this here**

**SAVES** 80% on machine installation costs (Am. Type Founders)  
20% on production-labor costs (Colo. Fuel & Iron Corp.)

*Here are three reasons Barry Mounts  
will give YOU these savings:*

**You don't have to drill floors, set anchors, and lag down machines.**

Just put a Barry Leveling Mount on each machine foot and set the machine right where you want it. The built-in vibration control won't let the machine "walk".

**You can easily move any machine — anywhere.**

All you do is pick it up and set it down in its new location. It's back in production in minutes.

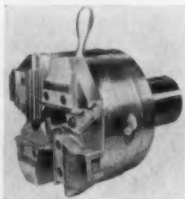
**You don't have to fuss with shims to get the machine level.**

Just turn Barry-mount leveling screws and tighten locknuts.

**Ask for: Reprint of "The Iron Age" report on proved savings;  
Plant-survey Chart showing cure for 8 production losses.**

**BARRY CONTROLS** incorporated, 783 Pleasant St., Watertown, Mass.

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**Landmatic Die Head**

# Does Your Tool Hardening Furnace Pass This **SENTRY** Test?

	<b>SENTRY</b>	<b>YOUR FURNACE</b>
<b>Uniform Chamber Temperature</b>	✓	
<b>Truly Neutral Atmosphere</b>	✓	
<b>No Scale or Decarburization</b>	✓	
<b>Sharp Edges Maintained</b>	✓	
<b>Consistent Maximum Hardness</b>	✓	
<b>Maximum Tool Life</b>	✓	
<b>Quality Results — Easily Duplicated</b>	✓	

The Sentry Furnace with the Sentry **DIAMOND BLOCK METHOD** of **ATMOSPHERIC CONTROL** brings new economy and efficiency in hardening all types of high speed and high carbon high chrome steels.

If you're getting less than **SENTRY** quality and performance — you're burning up profits, too! Check **SENTRY** against your furnace, point for point.

For final proof consult Sentry for a demonstration hardening of your high speed steel tools at no obligation.



# Sentry

**ELECTRIC  
FURNACES**

TRADEMARK

Request Catalog D-23 • Write **THE SENTRY CO., FOXBORO, MASS.**

4639

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December, 1957

modern machine shop 263

## **new shop equipment . . .**

distribute the pressures imposed by large diameter threading, four sets of hardened closing pins and bushings replace the customary two. The head opening and pull back springs have been strengthened to facilitate easy closing action and fast head opening at the completion of the threading op-

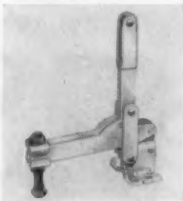
eration. When required for coarse pitch threading, an integral roughing and finishing attachment can be incorporated during head construction. This attachment allows roughing and finishing cuts without disturbing the die head size adjustment. Thus, the final cut will produce a thread of excellent finish with exact duplication of size in accordance with the predetermined size adjustment. Both heads are equip-

ped with tangential chasers, which are usable for 80 per cent of their original length and require only a few thousandths metal removal to restore the cutting edge. When re-grinding, it is unnecessary to remove the same amount of metal from each chaser. For more data circle 121 on Postpaid Card

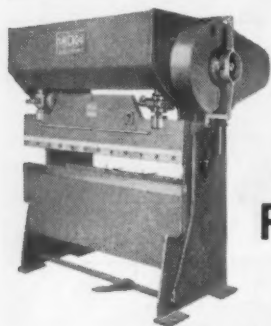
★ ★ ★

### **800 POUND HAND CLAMP**

Heavy duty hand clamps, with 800 pound load capacity on maximum

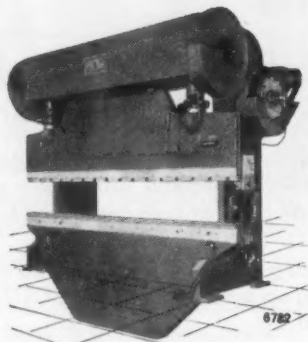


*Lapeer Clamp*



## **Advanced Design PRESS BRAKES**

**50  
Standard Sizes  
Capacities  
11 to 450 Tons**



*Complete recommendations for any job on request*



Press Brakes • Straight-Side-Type Presses • Press Brake Dies  
Hand and Power Bending Brakes • Special Metal-Forming Machines

# **DREIS & KRUMP MANUFACTURING CO.**

**7418 South Loomis Boulevard, Chicago 36, Illinois**  
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## FIRST IN SERVICE . . .

## TOPS IN QUALITY TAPS . . .

Hanson-Whitney has the long experienced know-how that leads the field in standard and special taps. H-W was first in introducing the "finished after hardening" process, developing the ground-thread tap for industry. Today, H-W has a proven background in the production of taps that assures absolute tops in quality, performance and dollar value.



Example: H-W skilled processing attains a finer concentricity between shank and thread which assures a far greater extent of continued uniformity in tapped holes. And it's performance like this, that enables your production specialists to cut costs over long-range programs.

For further cost economy . . . your schedules can depend on local H-W distributor service . . . providing complete stocks of all standard taps . . . plus H-W field engineering assistance on all special requirements.

*Write for complete literature.*

# Hanson-Whitney

COMPANY

Division of THE WHITNEY CHAIN CO.  
173 BARTHOLOMEW AVE., HARTFORD 2, CONN.

: THREAD GAGES : HOBS : CENTERING MACHINES : THREAD MILLING MACHINES AND CUTTERS

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**new shop equipment . . .**

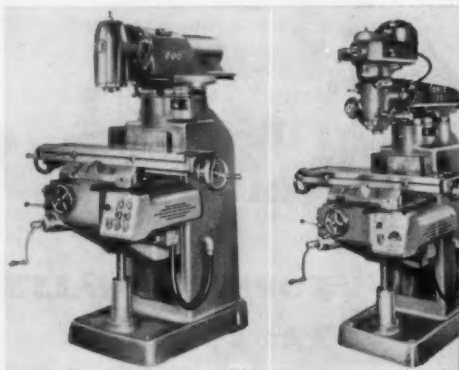
reach, have been added to the Knu-Vise line of air and manually operated clamps and pliers produced by Lapeer Manufacturing Co., 3048 Davison Rd., Lapeer, Mich. Designed and built for tough holding jobs, these sturdily constructed clamps are equipped with heavy pressure spindles and horizontal, rather than inclined, toggle bars. The vertical handle series offers Models V-800 and VC-800. The swivel base series offers the Models SB-800 and SBC-800.

For more data circle 122 on Postpaid Card



**TWO VERTICAL MILLING MACHINES ADDED TO LINE**

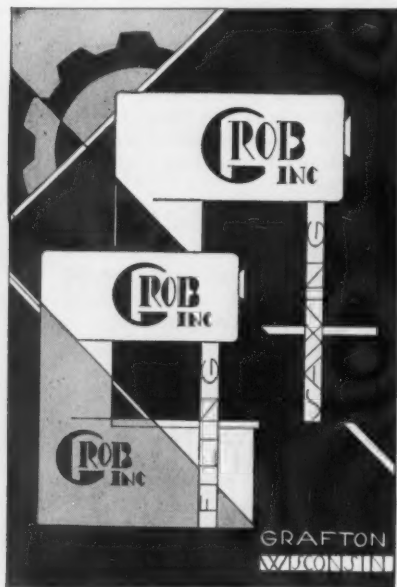
Famco Machine Co., 3122 Sheridan Rd., Kenosha 10, Wis., recently intro-



(Left) Famco 200 Vertical Mill; (right) Famco 100 Vertical Milling Machine

duced its 1 and 2 h.p. vertical mills to the machine tool field.

The 1 h.p. machine is primarily a toolroom mill and has a powerful precision built spindle head. Speed



For more data circle 513 on Postpaid Card  
266 modern machine shop

**NIELSEN**  
*Heavy Duty*  
*Live Centers*

Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

Write for catalog  
M on live centers

**NIELSEN, INC.** LAWTON, MICHIGAN

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December, 1957



YOU GET more\* WHEN  
YOU BUY BEARINGS FROM YOUR

**Bunting®**  
DISTRIBUTOR



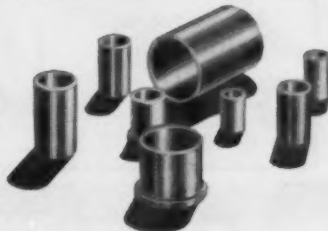
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responsibility**



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making ordering and pricing easy—  
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Stock Bearings and Bars assure that Bunting  
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December, 1957

modern machine shop 267

## new shop equipment . . .

changes from 120 to 4,300 r.p.m. or an optional speed range from 75 to 2,800 r.p.m. Speed changes can be made while the spindle is running. This mill has been designated as the Famco 100.

Power feed to the quill provides three feed rates — 0.0015, 0.003 and

0.006 inch per revolution. Located above the spindle nose is an easy to read micrometer depth gage stop that is graduated in thousands of an inch. An overload release clutch has been designed to slip at the stop setting or at excessive drill point pressure and provides consistent, accurate power feed stoppage.

A sturdy, accurate spindle and quill assembly has been made possible by a

quill diameter of more than 3½ inches, Timken bearings and a forged alloy steel spindle. The spindle has a No. 30 National Standard Taper and draw bar, thus giving the operator a strong, rigid tool support, unusual flexibility in the adaption of standard and shank tooling and a wide choice of accurate tooling.

The 2 h.p. machine, designed as the Famco 200, is a production type mill and has been constructed and designed to take the day-in, day-out pounding of heavy production work.

This powerful production type spindle head is driven by a built in motor for a more positive and direct power source. The motor rotor, located at

## "elektraLUBE"


by

# SOSSNER



### How "elektraLUBE" Works:

High pressures at A and B force out conventional lubricant. "elektraLUBE" takes over at these critical points and provides permanent super-lubrication.

 The "elektraLUBE" process imparts a thin ductile deposit which acts as a permanent super-lubricant...Not obtained by conventional plating...Not subject to chipping or peeling. Under working pressures the deposit imbeds itself into the microscopic pores of the ground tap, resulting in a smooth burnished surface. Reduces torque up to 25%...Freedom from "pickup", "loading", "welding", and "galling"...smoother threads in the workpiece.

### OTHER SOSSNER EXCLUSIVES

#### TRIPLE TEMPERED TAPS

a standard  
with SOSSNER  
delivers  
FULL VALUE



#### SPIRAL TAPS

The most complete line

Regular

Hook

Three Flute

Double Scoop



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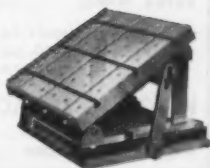


### TO SAVE DOLLARS THE *Robbins* WAY

Robbins angular tooling equipment often pays for itself the first few times you use it . . . but let's be conservative. Let's talk about writing off the cost over ten years. (About half the useful life of a "Magna-Sine!") Written off in this manner, the Model A-5 Magna-Sine illustrated represents an investment of around twelve cents a day!

This equipment saves dollars of valuable toolroom time on every job. Set-ups that require *hours* by other methods take just *minutes* the Robbins way. Set up to machine, grind or inspect any angle in just four simple steps: (1) Look up required angle in Table of Constants furnished with unit, (2) Select gage blocks indicated, (3) Place blocks between base and sine bar swivel block, (4) Secure the work . . . and you're ready to go!

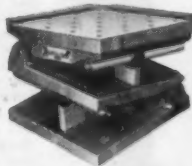
This simple, fast, sure method sets up any angle, single or compound, right or left hand, without V-blocks, angle plates or complicated "build-ups." Complete range of models and sizes puts Robbins precision equipment within the reach of every shop. Write now for literature.



HEAVY DUTY SINE PLATE  
FOR MACHINING



"MAGNA-SINE" WITH  
MAGNETIC TABLE



FOR INSPECTION AND  
LIGHT MACHINING

**OMER E.**

*Robbins*

24800 PLYMOUTH ROAD

DEPT. B

**COMPANY**

DETROIT 39, MICH.

Also manufacturers of special machinery, automatic assembly machinery.

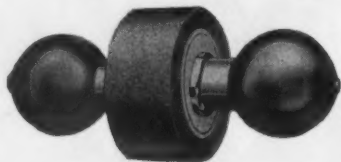
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5937

December, 1957

modern machine shop 269

## THE Original METCALF GRINDING WHEEL DRESSER



**BALANCED  
FAST—COOL CUTTING ACTION—  
HIGH SPEED WHEEL FORMING  
and CRUSHING**

COMPLETE ASSEMBLY .....\$7.95  
EXTRA WHEEL .....\$1.50

Made by the World's Largest Manufacturers of  
SAW SHARPENING and KNIFE GRINDING  
MACHINERY

**HANCHETT MANUFACTURING COMPANY**

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Portland, Oregon

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## Spin your RIVETS

**faster and more  
economically  
on the NOISELESS  
LINLEY  
RIVETER**



Rivet spinning on the Linley is a sure way to cut production costs. With Linley equipment, you can easily produce finely finished rivets even in close places. Send us samples of the work you want riveted, and without obligation we'll show you how it can be done the Linley-way and what it will cost.

Machines available for handling iron and cold rolled steel rivets up to 3/4" and larger size rivets in softer materials.

Send for Bulletin R today.

**LINLEY BROTHERS CO.**

Also builders of JIG BORERS

671 State St., Ext., Bridgeport 1, Conn.

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270 modern machine shop

## new shop equipment . . .

the rear of the ram for balance, mounts directly on the first change gear shaft, thus eliminating all unnecessary links in the transmission of power. Lapped, spiral bevel gears are used for the final angle reduction, providing quiet, smooth spindle speeds necessary for good surface finishes. Twelve spindle speeds are provided in a range of 80 to 2,100 revolutions per minute.

A pushbutton control station is remotely located from the button control cabinet and positioned for maximum operating convenience. The main motor is protected against overloads by heater elements located in the magnetic reversing starter.

For more data circle 123 on Postpaid Card

★ ★ ★

## PRECISION 3 FOOT RADIAL DRILL

Veet Industries, East Detroit, Mich., recently announced its improved, precision 3 foot Radial Drill. This radial incorporates many features which extend and prolong its usefulness in all metalworking stops. In addition to the score-proof nickel-moly alloy column, which is glass hard and turns on Timken Bearings, this radial now has hardened way inserts on the head and arm. A widened dovetail arm way triples the bearing surface for long lasting accuracy. A single lever arm clamp locks the arm to the column securely and quickly.

A large transmission encloses the feed gears in the oil bath for constant lubrication. Drive gears have been widened to carry more load and 16 spindle speeds are now provided in more uniform steps. A drill ejector in the spindle speeds tool changes, while raising and lowering the arm is accomplished by means of pushbuttons.

December, 1957

**YOU GET MORE**



**"CUTABILITY"**

with ...

**NEWCOMER**

*Controlled Quality*

**CARBIDES**

You can always rely  
on NEWCOMER  
performance ...

**FOR CUTTING STEEL**

Grade	Description	RECOMMENDED		
		Cut Depth	Feed	Speed (SFPM)
NS-15	Precision Finishing	.004"	.004"	250
		to .060"	to .024"	850
NS-2	General Purpose	1/4"	.005"	150
		to 1/2"	to .040"	525
NS-3	Milling and Roughing	1/4"	.010"	100
		to 1"	to .090"	500
NS-65	Heavy Roughing	1/4"	.020"	75
		to 1 1/2"	to .125"	200

**FOR CUTTING OTHER MATERIALS**

Grade	Description	RECOMMENDED		
		Cut Depth	Feed	Speed (SFPM)
NC-2	Precision Finishing	1/4"	.005"	200
		to 1/2"	to .020"	1000
NC-3	General Purpose and Milling	1/4"	.010"	200
		to 1/2"	to .040"	1000
NC-4	Roughing	1/4"	.020"	Moderate
		to 1"	to .093"	80 to 1000
NC-5	Extra Heavy Roughing	1/4"	.040"	Slow 20
		to 1 1/2"	to .125"	to 150

**FOR HIGH VELOCITY MACHINING**

Grade	Description	RECOMMENDED		
		Cut Depth	Feed	Speed (SFPM)
NewMet NM-95	Not a ceramic nor a tungsten carbide, but an all new METALLIC CUTTING MATERIAL for cutting steel and other materials	.001" to 1/4"	.001" to .015"	to 1500

For reliable and consistent  
metal cutting ... specify

**NEWCOMER** *Controlled Quality*  
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For high velocity machining ... it's NewMet  
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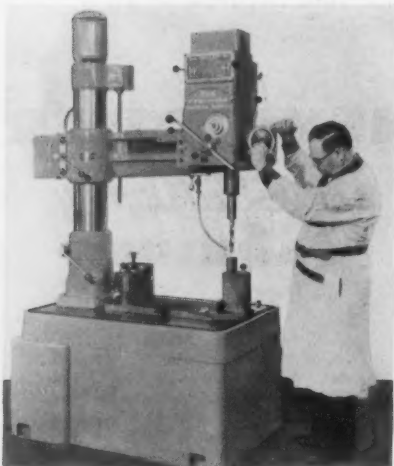
Sales Offices located in Principal Cities

For more data circle 520 on Postpaid Card

December, 1957

modern machine shop 271

**new shop equipment . . .**



**Veet Radial Drill speeds fixture drilling**

The versatility of this radial is further evidenced in its convenient working height of 26 inches, since the arm and head are raised or lowered to suit the job. The same convenient work height is ideal for any job up to 36 inches under the spindle in the standard model. Rigidity of the shorter column anchored at the 26 inch work height is comparable to a 10 inch diameter column anchored at floor level.

For fabricating shops requiring greater clearance, the company has developed a floor level base model with 52 inch capacity under the spindle, and a double end base model which, by swinging the arm 180 degrees, provides a large capacity of 62 inches under the spindle.

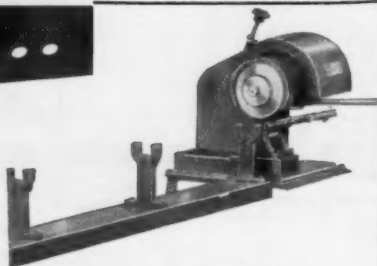
To reduce downtime in case of accidental breakage, all models are "service-designed" to permit quick removal of head, transmission, drive unit or elevation gear box.

For more data circle 124 on Postpaid Card

**ZIP... ZIP...**

## **CUTS TUBES FAST**

It zips right through tubes from  $\frac{3}{8}$ " to  $1\frac{1}{4}$ " O.D., from light gauge to 16-gauge wall thicknesses. Cuts up to 2,000 pieces an hour, effortlessly, with just a stroke of the handle. Convenient, adjustable table with 5 Dual-Roller Forks. Also available, Cut-Off Machines for pipes and tubes up to 12" diameter, air or hand-operated.



**and we'll prove it!**

Simply send us a sample of your tubes, we'll show you how clean and fast a Continental Rotary No. 1 Cut-Off Machine cuts, and return the pieces for your inspection along with actual time studies.

**REQUEST YOUR  
CONTINENTAL  
CATALOG TODAY**

*Continental* **MACHINE CO.**

—SINCE 1919—

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For Precision Work, nothing equals  
the touch of an OILSTONE FILE



**Honing gives "micrometer fine" finish . . .** INDIA Square File, medium grit,  $\frac{3}{8}$ " x 4", does the job on this hard, high-speed milling cutter after sharpening with grinding wheel.

Triangular, round, tapers, diamond, squares . . . over 35 different shapes and 97 sizes are available in INDIA and HARD ARKANSAS Oilstone Files for sharpening, deburring and fitting to fine tolerances. Find out why master mechanics, tool and die makers prefer oilstone files—send for your free copy of the Hand Stoning Handbook. Address Behr-Manning Co., Troy, N. Y., Dept. MM-12.



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TROY, N. Y.

A DIVISION OF NORTON COMPANY



BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes<sup>SM</sup>  
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories

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December, 1957

modern machine shop 273

**new shop equipment . . .**

### **LIGHTWEIGHT TAPPING ATTACHMENT**

Tapmatic Corp., 845 West 16th St., Costa Mesa, Calif., has announced the featherweight Tapmatic 100 Tapping Attachment.

Designed to meet the need in industry for a compact, lightweight tapping

attachment, this model weighs only 10 ounces, has a maximum diameter of 1½ inches and a maximum length of 3½ inches. The rated capacity for tapping in steel is from No. 00 to 6.

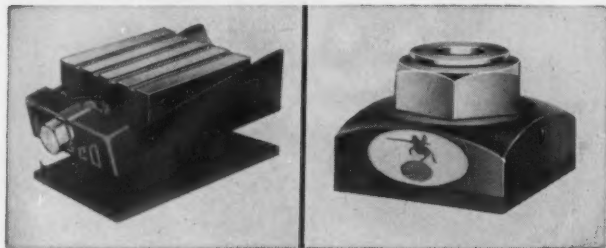
The Tapmatic 100 features a lifetime positive torque control clutch, free axial floating action and instantaneous, planetary ball, reversing mechanism.

The human or mechanical lead error obtained with conventional attach-

ments is said to be eliminated by the free floating action of this unit. The dimensions and forms of the thread produced are solely dependent upon the tap itself—it is claimed that a perfect tap will always produce a perfect thread even with operators who are inexperienced.

Tap breakage and work spoilage are drastically reduced by its positive torque adjustment clutch. This spring loaded ball clutch stops the tap in-

## *any new machine deserves an* **EMPCO** *leveling jack*



### **DEPENDABLE MACHINE SUPPORT WITH BUILT-IN PRECISION LEVELING**

Installing new machines? *Set* them level, and *keep* them level with EMPCO Leveling Jacks. EMPCO jacks provide a solid, smoothly adjustable foundation for machine tools, large surface plates, automation lines, tool room and production equipment of all types. The result is better machine performance . . . higher precision . . . reduced downtime and maintenance. Where vibration problems exist,

use VI-SORB Mounting Pads with your EMPCO Jacks. They control internal and transmitted vibration, reduce noise and prevent creepage (eliminate the need for anchor bolts in many cases). EMPCO Jacks are available in six styles, 25 models. VI-SORB Mounting Pads are cut to fit. Write us about your machine installation problems.

Send Today for Descriptive Bulletin No. 100—  
The Enterprise Machine Parts Corporation  
2715 Jerome Avenue • Detroit 12, Michigan



**Tapmatic 100 Tapping Attachment is very lightweight**

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# AMES

*...the preferred Dial  
Indicators...*



have forged cases, backs and wheel supports  
for maximum stability

The extreme care put into the design and material selection of component parts typifies the Ames approach to manufacturing a superlative product. It's just one of the reasons why so many quality control engineers specify Ames Dial Indicators as "preferred". Write today for complete information.

*Representatives in principal cities*



## B.C. AMES CO.

*29 Ames Street, Waltham 54, Mass.*

MANUFACTURERS OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS  
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December, 1957

modern machine shop 275

### new shop equipment . . .

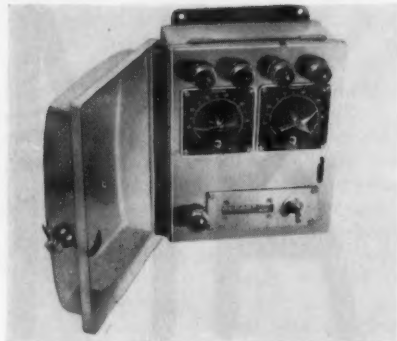
stantly when the tap becomes dull, loaded, hits a hard spot or bottoms in a blind hole. Faster production of tapped holes to specified tolerance is thereby claimed to be assured.

For more data circle 125 on Postpaid Card

★ ★ ★

### TOOL COUNTERS CONTROL TOOL LIFE

Toolitrol Counter Units, designed for installation as an accessory on single or multiple spindle machines, have been introduced by Scully-Jones and Co., 1909 South Rockwell St., Chicago 8, Ill. These counters take the human element out of resharpener procedures and permit cost reductions by controlling tool change periods and



Scully-Jones Two Unit Toolitrol Counter

extending tool life. Significant savings are said to be possible in machines requiring use of relatively expensive cutting tools, such as broaches, hobs, gear shapers and so on, or in any integrated production line where machine down time is a major factor.



INDUSTRIAL

**GAS**

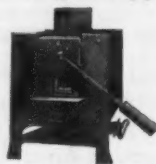
EQUIPMENT

BURNERS & FURNACES (Heat Treating, Melting, Soldering)

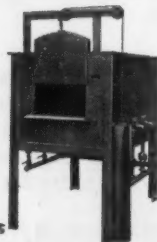
### NO BLOWER OR OTHER POWER NEEDED

. . . just connect to gas supply!

Outstanding service since 1911! Each unit, with the famous "BUZZER" Venturi, delivers the hottest, quickest heat attainable without a blower. Full range control of heat and turn-down. Standards or specials available for manufactured, natural or liquefied gas applications.



High Speed Full  
Muffle Furnaces



Large Floor Type Oven Furnaces

Write for New  
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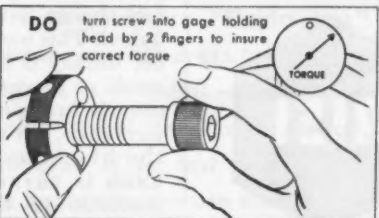
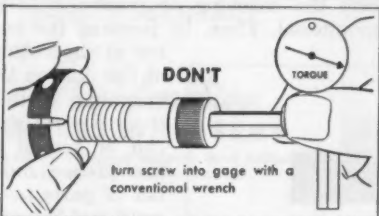
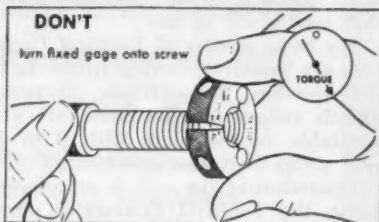


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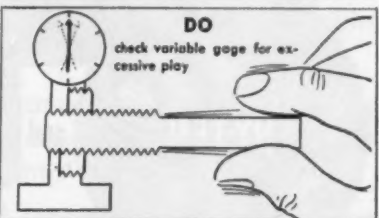
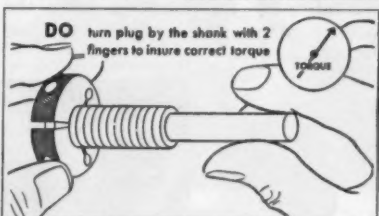
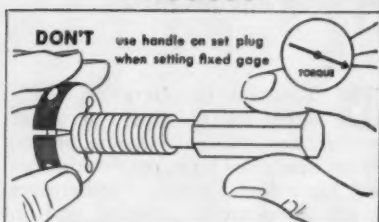
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#### When measuring high limits



#### When gaging gages



These illustrations from new SPS booklet show some of the do's and don'ts of gaging precision threads.

## 3A threads: what they are; how to gage them—new SPS booklet tells all

Threads made to Class 3A fit are the most precise in general use in industry. But you do not always get the 3A precision you specify. Because of many different gaging techniques that yield varying results, screws with threads well outside the Class 3A tolerance limits often pass inspection.

SPS has prepared a new booklet on this subject. It explains clearly what Class 3A threads are and the pros and cons involved in the widely varying gaging techniques in use today. It reviews the gaging of high and low limits of 3A threads, sampling techniques, and even the methods of gaging gages.

All standard UNBRAKO socket screw products fall within specified tolerance limits no

matter what method is used to gage them. Leading industrial distributors carry complete stocks. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.



Form 2239, "Class 3A Threads: what they are; how to gage them." 16 pages, with many illustrations. Write for your free copy today.

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STANDARD PRESSED STEEL CO.

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JENKINTOWN PENNSYLVANIA

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December, 1957

modern machine shop 277

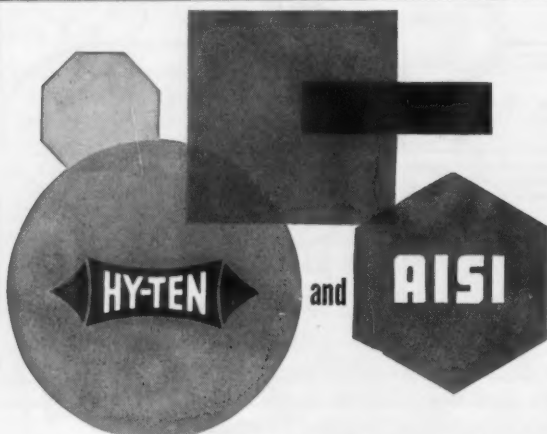
## **new shop equipment . . .**

The Toolitrol Counters provide a visible signal for the operator or supervisor and prevent anyone serving several machines from overlooking the need for a tool change. Furthermore, the counters can be provided with an optional relay for shutting down the machine when the counter reaches

zero, making certain that an overly dull tool is not in use.

Six basic models of Toolitrol Counters are available, having from one to six switches. In addition, 15 count switch ranges can be provided. The available ranges begin with 0 to 72 and go as high as 0 to 54,000.

Operation of the unit is as follows: First, the Toolitrol Counter is wired into the machine or machines being monitored. Then, by pressing the button at the bottom of the dial on the counter switch, the red reset stop can be moved to the proper number of parts to be produced before a tool change is required. This number usually is the result of previous manufacturing experience. Next, the black reset knob is turned clockwise to the stop and the counter is ready for action. When the machine is turned on, a green light on the Toolitrol Counter panel comes on to indicate that the machine and counter are operating. The black reset knob continues to turn counter-clockwise, as the machine cycles, indicating the amount of tool life remaining. When the tool reaches



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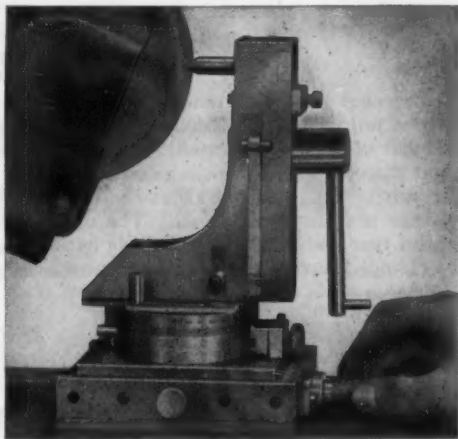
# Tough Grinding Wheel Forms Dressed Easy as A, B, C

eliminate elaborate set-ups  
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**.0001" ACCURACY**

## *Fluidmotion* **WHEEL DRESSERS**

*dress two angles tangent to a radius  
in one continuous motion*



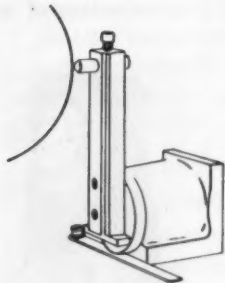
With the unique "Fluidmotion" Dresser, you can dress two angles tangent to a radius — using one handle in one continuous motion. Operation is so fast and simple that beginners can use them.

Adaptable to all type cylindrical and surface grinders.

**A.** Obtain micrometer reading; add required convex radius or subtract required concave radius.

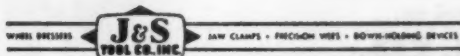
**B.** Loosen jib with wrench and "mike" over lower pins to reading obtained above.

**C.** Tighten jib. Set stops for two angles. Ready for action.



Also available: "FORM MASTER" Dresser, capable of dressing any radii up to 12" convex, up to 15" concave. Prices start at

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## new shop equipment . . .

80 per cent (or other percentage that can be adjusted at the factory) of the number of cycles permitted, an amber light directly over the switch comes on to warn the operator that a tool change is coming up shortly. The operator can quickly see which tools can be changed during the next down time

period, handling them in groups on multiple spindle machines to reduce work stoppages.

When the reset knob reaches O, both the green and amber lights go off and a red light is turned on, indicating the need for an immediate tool change. If the optional relay is provided, the machine also stops automatically.

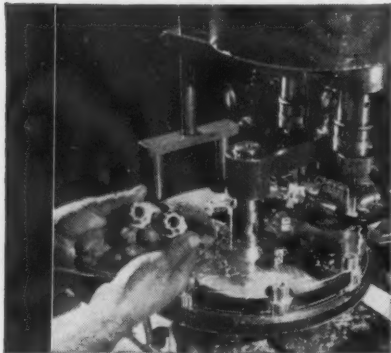
Sizes of the Toolitrol Counter Units range from 6 inches wide, 8 inches long and 5 inches deep for the single counter to 16 inches wide, 14 inches long and 7½ inches deep for the six unit counter.

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## TAPPING . . . 2,040 Aluminum Pistons PER HOUR

½" . . thread—¾" stroke at 500 RPM

That's *actual production tapping*, as accomplished with a Kaufman Model 5-24 lead screw tapping machine, tooled with a 4 division index, dial and dial spindle multiple head. "Setting Up" for other tapping operations is accomplished by replacing dial plate and taps.



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## KEYLESS DRILL CHUCK

R. B. Tool Co.,  
785 North Broadway,  
White Plains, N. Y., has  
announced the  
introduction of a



R. B. Keyless  
Drill Chuck

# DECKEL

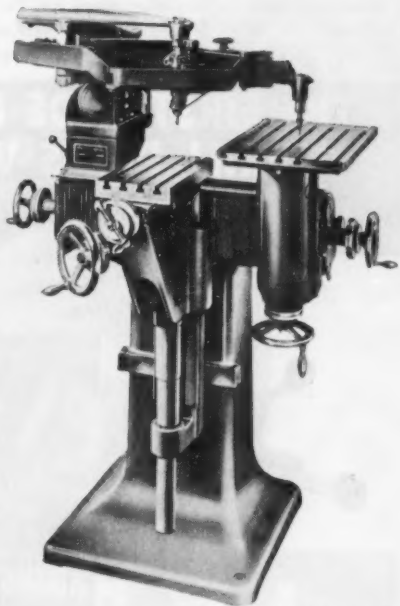
## Engravers And Copy Millers Cut Costs, Increase Accuracy

Designed for fingertip control, the 3-dimensional pantograph of Deckel Engraving and Profiling Millers assures absolute accuracy of reproduction. Ease of operation cuts down needed production time. High surface finish requires little or no hand finishing—reducing costs even further.

Pre-loaded bearings in the pantograph provide easy guidance, playless motion, minimized vibration. Pantograph weight is delicately balanced during lowering and lifting by a spring within the column. Control and view of the entire operation is simplified by support of the master and workpiece at nearly the same level. Unlike other makes, cutter and tracer move in the same direction for all three dimensions. Reducing or enlarging ratios run from 1:1.5 to 1:10.

The Deckel GK-12 is designed to produce delicate engraving, light milling, dies for plastic molding or die casting.

The Deckel GK-21 provides increased metal cutting capacity for rough and copy milling of dies and molds up to 550 lbs.



The Deckel GK-12 Pantograph  
Engraving & Profiling Miller

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## new shop equipment . . .

line of drill chucks. Accuracy of concentricity is the outstanding feature of the R. B. Precision Keyless Drill Chuck-Type Validus. Sealed ball bearings allow for easy opening and closing by hand. All working parts, are hardened and carefully ground. The chuck is available in four popular sizes.

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## CARBIDE CUT-OFF BLADE COMBINES CHAMFERING WITH PARTING

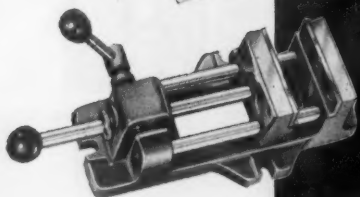
A solid carbide circular cut-off blade for automatic screw machines saves considerable time and labor while improving work quality, according to the manufacturer, Gay-Lee Co., Clawson, Mich. Chamfering is done simultaneously with cutting-off because of the new design, which provides a chamfering

edge in addition to the cut-off edge. Work can be cut off in either direction of rotation, since a portion of the blade is gashed to allow clearance. A construction feature, the brazed steel hub which holds the solid carbide blade firmly in place, assures long, trouble free service. The tools are available from stock with outside diameters from 1 $\frac{3}{4}$  inches to 3 inches and normal thicknesses.

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*that safely handles both  
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A precision built device designed to cut tooling costs and increase production.

Heavy 4" wide removable jaw inserts allow simple, quick adaptation for low cost jigs and fixtures. 3 $\frac{1}{2}$ " opening. Easy hand pressure on hardened and micro-ground bar locks and holds the work fast.

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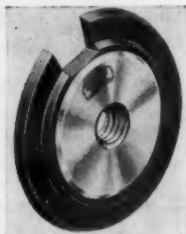
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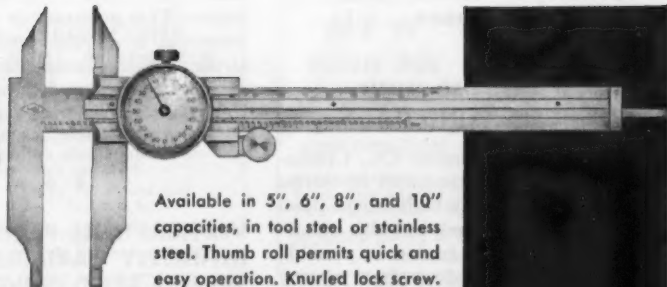
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**Gay-Lee Carbide  
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With Dial  
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Reading  
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In .001"  
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Reading Errors



Available in 5", 6", 8", and 10"  
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easy operation. Knurled lock screw.  
Full measuring capacity — outside,  
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CAPACITIES UP TO  $\frac{3}{8}$ "

ALL OPERATING PARTS HARDENED AND INTERCHANGEABLE

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Tighten the easy-grip sleeve by hand and the tool is chucked.  
Drill shank does not slip since the gripping power of the  
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Built-in ball bearing; drill chuck therefore easily opened  
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**new shop equipment . . .**

### **SHEAR IS EQUIPPED WITH ANGULAR SHEARING GAGE**

The Cincinnati Shaper Co., Cincinnati 25, Ohio, has introduced its Series 10 by 8 Foot Shear, which is equipped with a special, pivoted, angular shearing gage. This gage makes it possible to accurately shear steel sheet at any one of a number of different design angles, within a total angular tolerance of only two minutes. The sheets being sheared will be transformer laminations, varying in length from 7¼ inches to 15 feet. Material is silicon steel, electric grain oriented, 0.012 to 0.014 inch thick.

The pivot point for the angular shearing gage is in the shear table. The gage support carriage travels on a floor mounted track. Movement of the carriage from one to another of the angular gaging positions is rapid and simple. All gage stops are equipped with micrometer adjustments, which provides extreme accuracy in gaging the length of the sheared

pieces. This accuracy is insured by the powerful hydraulic holddowns of the shear, which clamp the work with 5 tons of pressure. Operating speed of the shear is 65 strokes per minute.

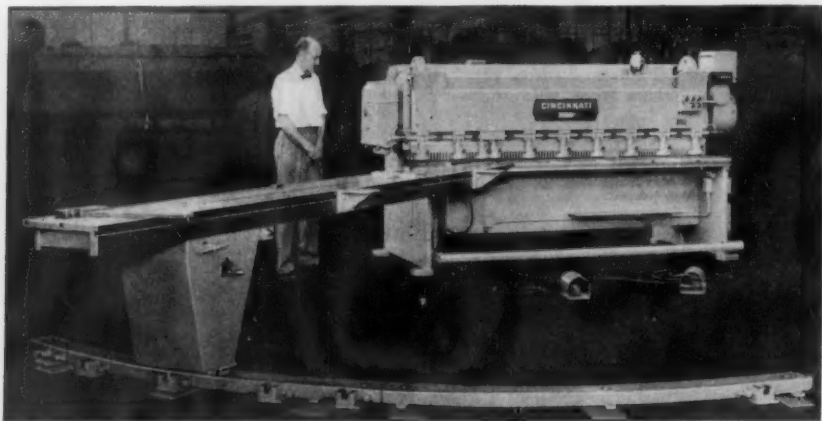
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### **VERTICAL MILL FEATURES INFINITELY VARIABLE SPINDLE SPEED DRIVE**

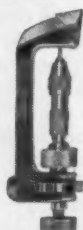
An improved vertical mill, in which an infinitely variable spindle speed drive is an exclusive feature, has been announced by Fenlind Engineering Co., 5602 Pike Rd., Rockford, Ill. Known as the Rockford Mill, the machine also incorporates a rigidly held rotating head, a vibration free quill, positive automatic depth control and many other design innovations.

The stepless variable speed drive makes it possible to set the spindle speed exactly in accordance with specifications for the job, with the result that tool life is prolonged and the work improved. Any desired speed is obtainable, from 85 to 560 r.p.m. in low



*Cincinnati Series 10 by 8 Foot Shearing Machine has angular pivoted shearing gage*





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## **new shop equipment . . .**

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has the desired speed. The head of the Rockford Mill is rigidly mounted to the ram with three bolts. By loosening these bolts, the operator can easily swivel the head through 360 degrees to any desired angle. It is again held in exact right angle alignment, with no sag between the head and the ram, when the bolts are tightened.

The motor is mounted in the base of the mill, completely eliminating possible transfer of motor shock or vibration to the spindle. This results in smooth operation, with complete freedom from tool marks on every type of cut.

A positive quill control lever provides a stepless quill feed range from 0 (neutral) to 0.008 inch per revolution. The spindle feed can be stopped instantly in either of two ways: by moving the quill control lever to neutral or by pressing the clutch control in the center of the fine feeding hand-wheel. This makes it unnecessary to stop the spindle and easy to obtain correct depth when doing blind drilling.

The quill travel is stopped automatically by a built in override

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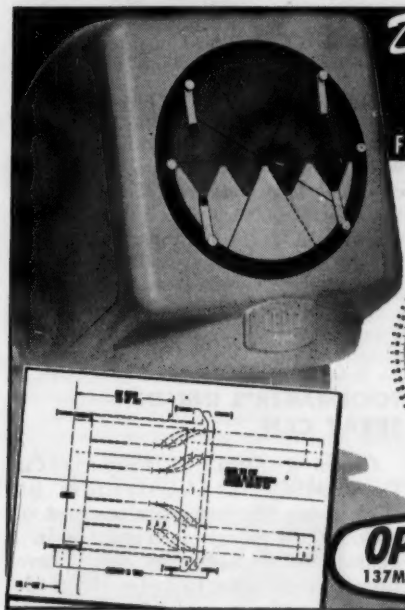
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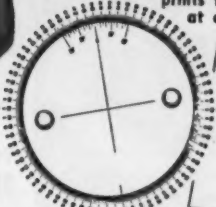


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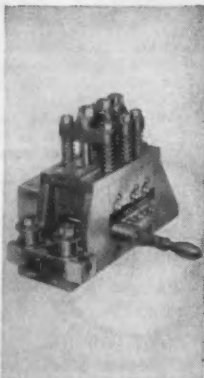
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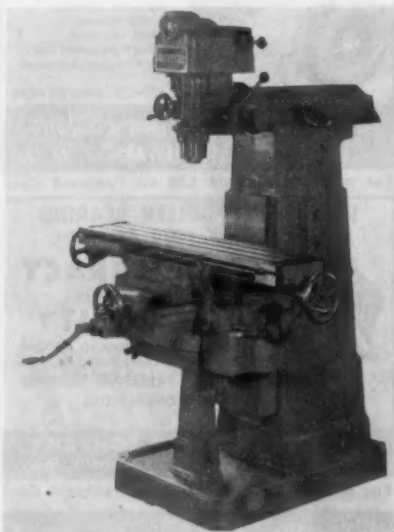
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clutch when the depth gage contacts a  
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## new shop equipment . . .

production layout men and sheet metal shops. Simply hold the can 12 to 14 inches from the work, press the spray top and spray a smooth even coating over the work.

Crown Toolmaker's Ink is readily removed with Crown Ink Remover or lacquer thinner.

The guaranteed spray can will be replaced free of charge if it fails to operate for any reason. Cans will not leak or lose pressure — spray heads function perfectly if used according to directions.

Toolmaker's ink in aerosol spray cans does away with messy and wasteful methods of flowing ink onto the work; is quick, easy and neat. The spray cans are supplied in both 6 and 12 ounce sizes—the smaller can design-



Crown Toolmaker's Ink in aerosol spray can

ed for easier use in shops with many benches or smaller dimensioned work. Fast drying Crown Toolmaker's Ink provides a perfect medium for scribing crisp fine lines.

This ink will not flake or peel, adheres to all metals, glass and plastic and resists heat when dry.

For more data circle 131 on Postpaid Card

★ ★ ★ ★ ★

## Beverly THROATLESS SHEAR *Cut any Shape...* STRAIGHT OR IRREGULAR



B-3 with Ball  
Bearing Hold  
Down

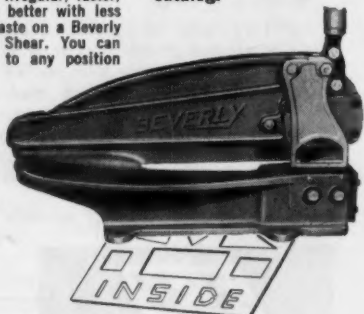
Make any cut — curved, straight or irregular, faster, easier and better with less material waste on a Beverly Throatless Shear. You can turn work to any position

and make a clean cut as you go. Handles heavy gauges with ease—lighter metals without distortion. 4 models — capacities 18 gauge to 3/16" mild. All shears equipped with H.C. H.C. Blades for cutting Stainless.

### INSIDE SLOTTER

8" Reach — 16 ga. cap. Makes inside slotting cutting faster, easier, cleaner. Punch and die arrangement of 5 blades assures accuracy, clean cutting action. Cuts 2 1/2 x 1/4" slot at one stroke. Throat design permits pivoting work at any point in stroke for special inside cuts. Note sample cuts at left.

See your Beverly Dealer or write for illustrated catalog.



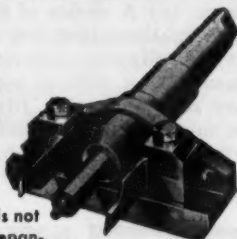
BEVERLY SHEAR MFG. CO., 3000 W. 111th St., Chicago 43, Ill.

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## Cut Costs on Hole-Cutting! USE THE NEW ... BOREMASTER

Finished holes  
1½" to 11¼"  
diameter to a  
depth of 8" on  
your present  
equipment.



BOREMASTER is not just another Trepanning Cutter, but a real heavy duty tool. Stock is removed in one piece eliminating waste. Remember ...

**TIME SAVINGS + MATERIAL SAVINGS  
= COST SAVINGS**

• Write us today for complete details!

Also without pilot, and shorter  
shank for Turret Lathes, etc.

Sole U.S.A. Representatives:

**NEISE  
MODERN TOOLS**

**KARL A. NEISE**  
404 4th Ave., Dept. MMS,  
New York 16, N. Y.

For more data circle 549 on Postpaid Card

## SPRING LOADED LIVE CENTER



Eliminate excessive  
overhang of your  
center. Use the ac-  
curate, rugged, re-  
liable \*NIROL. The  
spring loaded Live  
Center that compen-  
sates for expansion  
and contraction in  
actual operation.

Write  
for complete  
information.

\*Reg. U.S. Pat. Off.



**\* NIROL** MANUFACTURING  
COMPANY

901 H'WAY 22, N. PLAINFIELD, N. J.

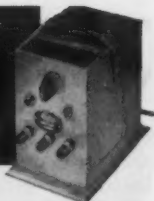
For more data circle 550 on Postpaid Card

December, 1957

## THE

# Luma

## WAY

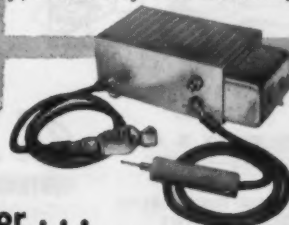


## for ... PRODUCTION SOLDERING

Handles numerous soldering jobs from fine precision to medium-heavy industrial. More than 16 styles of electrode holders to fit individual soft or hard soldering operations.

From 6 to 30 stages of heat with a selector switch used in conjunction with 3 secondary terminals.

A wide range of power—5 to 2500 watts—quickly supplies concentrated heat at exact area—insures perfectly soldered joints with maximum Speed, Safety, Flexibility and Economy.



## for ... ETCHING & DEMAGNETIZING

Marks the hardest steel, stainless steel, steel alloys or carbides with the ease and legibility of a pencil. 4 types of interchangeable marking points available to serve every purpose. 6 to 36 distinct marking heats. Easy to operate. Two tools in one. Demagnetizes over a 4 to 8-inch width. Especially valuable when tools have been in contact with magnetic chuck.

Write for New Catalog descriptive of all model Solder Tools, Etch-tools, Demagnetizers ... today.



**THE LUMA  
ELECTRIC  
EQUIPMENT CO.**

P.O. Box 132-M5 • Toledo, Ohio

For more data circle 551 on Postpaid Card

modern machine shop 291

## new shop equipment . . .

### VERTICAL MICRO PROJECTOR

George Scherr Co., 200-MM Lafayette St., New York 12, N. Y., has introduced its Micro Projector, which features a vertical principle of design offering these important advantages: (a) A horizontal stage onto which work of a flat nature is simply laid

without aid of fixtures or holding devices. (b) A comfortably inclined screen on which the enlarged image is reproduced directly in front of the observer. (c) A choice of fixed standard magnifications that are changed simply by slipping different projection lenses into a vertical socket in which they rest by gravity. (d) When using the micrometer cross slide, both measuring motions are performed on the

★ ★ ★ ★ ★



**T-NUT & STUD SETS—  
12 SIZES**

**STEP BLOCK & CLAMP  
SETS—7 SIZES**

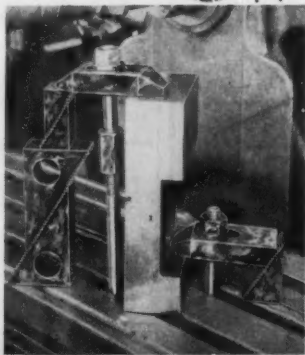
QUARTER TURN SCREWS  
SHOULDER SCREWS  
JIG FEET (3 TYPES)  
SPHERICAL WASHERS  
LATCH BOLTS  
FLANGED NUTS  
CUT THREAD STUDS  
TEE NUTS  
COUPLING NUTS  
ADJUSTABLE STEP BLOCKS  
FIXTURE KEYS  
KNURLED HEAD SCREWS  
TOGGLE SHOE CLAMPS &  
V-FADS  
STRAP CLAMPS (PLAIN &  
STEP TYPE)  
CAST IRON & ALUMINUM  
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Save with  
NORTHWESTERN**



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Stratford, Connecticut  
Wilmington, Delaware  
Chicago, Illinois  
Rockford, Illinois  
Indianapolis, Indiana  
Richmond, Indiana  
South Bend, Indiana  
Cedar Rapids, Iowa  
Wichita, Kansas  
New Orleans, Louisiana  
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Hyde Park, Massachusetts  
Detroit, Michigan  
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*Northwestern*

119 HOLIER AVE., DAYTON 3, OHIO



For more data circle 552 on Postpaid Card

## REPRINTS AVAILABLE

The following reprints are available free of charge in limited quantities upon letterhead request to this magazine:

"Grinding Jet Blades by Abrasive Belt Method"

"Automatic Drill Feeds Speed Production"

"Forming Aerodynamic Structures"

"Modernize Your Shop and Save Money"

"Producing Critical Airplane Control Components"

"Chill-Shunt Tooling in Tungsten Arc Welding"

"Clinometers and Their Application"

"How Burroughs Saved a Million Dollars"

"Producing Leakproof Check Valves"

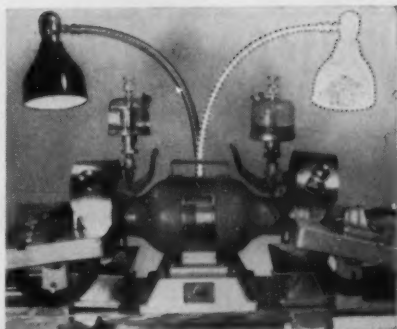
"Converting a Grinder to Increase Production"

"How to Guarantee Your Own Success"

"Magnetic Chuck Facilitates Drilling Operations"

**modern  
machine  
shop**

431 Main St., Cincinnati 2, Ohio



"Coolie-Grinderlap" by  
Diamond Tool Company

LOOK HOW EASY  
**VIMCO** *Lights*  
CAN BE  
ADJUSTED

Vimcolights adjust **instantly** to suit the operator's needs. No screws or bolts to loosen, — then reset. Vimcolights remain rigidly in position regardless of vibrations even on heavy presses and forges. Six standard models are available . . . send for Bulletin 75. Machine designers send for "OEM Bulletin".

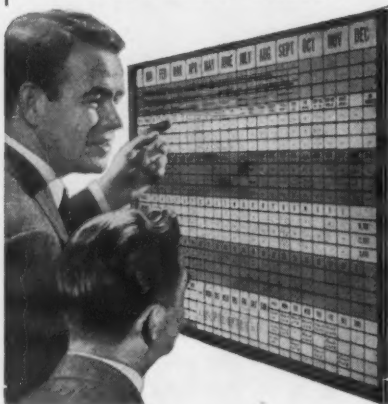
Vimcolights are  listed

**VIMCO MFG. CO., Inc.**

Since 1919

111 Brayton Street, Buffalo 13, N. Y.  
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modern machine shop 293

## How To Get Things Done Better And Faster



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- ☆ Gives Graphic Picture — Saves Time, Saves Money, Prevents Errors
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Complete price **\$49.50** including cards

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### GRAPHIC SYSTEMS

55 West 42nd Street • New York 36, N. Y.

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294 modern machine shop

### new shop equipment . . .

same plane; namely, the horizontal and most natural one.

A rigid floor base makes this model a self-contained unit. The column slide is adjustable for wear by means of gibs and is claimed to hold square indefinitely. A graduated adjustment will tilt the stage to a desired helix angle of a thread or rake angle of a form tool. The 4 inch diameter stage opening and a 14 inch round screen result in extra large capacity.

Custom made precision coated lenses and achromatic condenser lenses are employed for different objectives 10 to 100x magnification. All lenses are set to the correct magnification at the factory. No readjustment or experimenting are required.

This projector will make it possible for smaller companies and sub-divisions of large manufacturing plants to use the profitable advantages of micro projecting. Accessories, such as micro-meter cross slide stage, with 2 by 2 inch range; rotary protractor ring,



Scherr Micro Projector shown here in use

December, 1957

New 1957 Model "55"

## RADIUS DRESSER



Low Price \$124.50  
with Diamond

SOMERSET TOOL CO.  
320 Virginia St.

OUTPERFORMS THEM ALL  
Cut production time without sacrificing accuracy! Easy to set, easy to see, eliminates necessity of guard removal. Somerset Radius Dresser turns "tricky" jobs into routine operations.

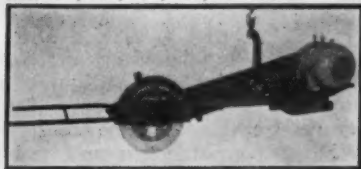
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illustrated folder

Hillside, N. J.

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## MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels



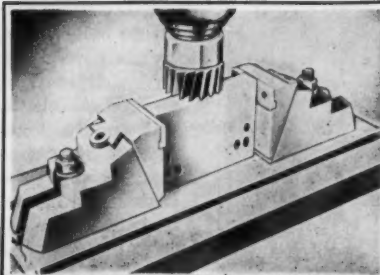
Ask for Descriptive Circular

MUMMERT-DIXON CO.

120 Philadelphia St.

Hanover, Pa.

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## MASTER GRIPPING CLAWS System Hubner

### WHY use them?

1. Clamping action Vertical as well as Horizontal — pressing workpiece down directly on the machine table. No hammering — no air between. 2. Gain more working room. 3. Faster and more secure setups. Easier to handle. 4. Unlimited jaw opening. 5. No straps overlapping on the workpiece; more machining surface. 6. Extremely versatile—take light cuts or heavy cuts, use on small machines or heaviest production machines.

### Exclusive Agents

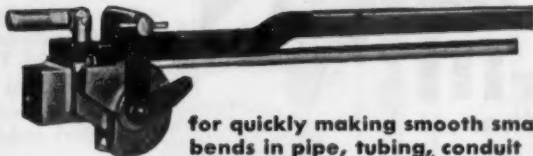
KARL A. NEISE

404 4th Ave., Dept. MMS,  
New York 16, N. Y.

NEISE  
MODERN TOOLS

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## GREENLEE HAND BENDER

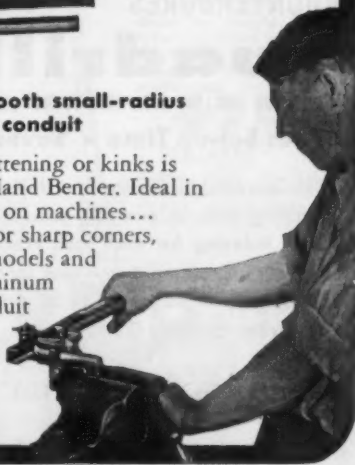


for quickly making smooth small-radius  
bends in pipe, tubing, conduit

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit



GET FREE FOLDER E-207 AND  
BOOKLET E-201. Complete  
facts and prices on the Greenlee  
Bender line. Write Greenlee  
Tool Company, 1992 Herbert  
Avenue, Rockford, Illinois.



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**new shop equipment . . .**

reading to 5 minutes of arc by means of vernier; center support; surface illuminator; curtain canopy and accessory chest will add to the usefulness of the instrument. Clear and ground glass screens, as well as standard and special comparator charts are available. For more data circle 132 on Postpaid Card

**FOUNDRY CUT-OFF WHEEL PROVIDES LONG LIFE**

Unusual wheel life is claimed by the Bay State Abrasive Products Co., Westboro, Mass., for its BZ2AA Reinforced Cut-Off Wheel for off hand floor stand and swing frame applications.

The increased efficiency of the BZ2AA Wheel results from an improved resin bond. This bond is described as having wearing qualities more closely

matched to the wearing and fracturing behavior of the abrasive grain. In addition, it possesses chemical and heat resistant properties that support the grains cutting action under the extreme heat and the pressure of cutting-off.

The BZ2AA Cut-Off Wheel is recommended by the manufacturer for foundry cut-off work, particularly. The durable character of the bond makes it suited for cast iron, steel and the

**DOES THE WORK OF**  
**4 DRILL PRESSES**

FITS  
ALMOST ANY  
DRILL  
PRESS

**DRILLS—REAMS  
COUNTERSINKS  
COUNTERBORES**

**quadrill**



4 POSITION DRILLING & TAPPING TURRET HEAD

**Saves Set-up Time • Saves Production Time**

With Quadrill you can use four drilling or cutting tools on one drill press by simply indexing for each tool. Precision built for rugged duty—long service. Specify make and size of drill press when ordering QUADRILL.

**CHICAGO QUADRILL**

*Company*

1854 BUSSE HIGHWAY • DES PLAINES, ILL.

For more data circle 559 on Postpaid Card



**Bay State Reinforced Cut-Off Wheel**



## The STEVENS Line SINCE 1925

Introducing NEW series



15" ROTARY  
TABLE—STD.

ROTARY TABLES, 5-7½-8-12-15-18-24"  
sizes both standard and dial indexing types  
ADJUSTABLE TILTING TABLES, #0-1-2  
COMPOUND TABLES, #1-2  
ROTARY-COMPOUND TABLES, #1-1½-2  
INDEX CENTERS—multiple spindle  
SPECIAL MACHINES—designed and built

See your dealer or write for bulletins

**The John B. Stevens Company**

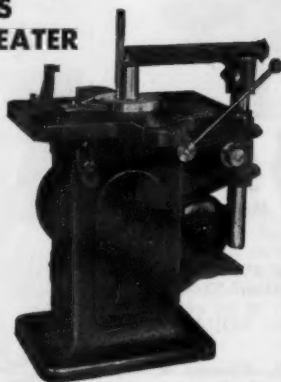
Main Street, Somersville, Conn., U. S. A.

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## Why Use A Shaper to cut Keyways when a DAVIS KEYSEATER

will  
do the  
job so  
much  
quicker  
and  
better?

Send  
for  
Circular



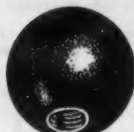
**DAVIS KEYSEATER CO.**

Exchange and Glasgow Sts.  
ROCHESTER, N. Y.

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December, 1957

# REID TOOL ROOM NEEDS!

## CONTROL BALL HANDLES



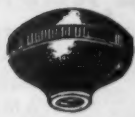
Round Plastic



Oval Plastic



Round Steel



Mushroom Plastic

For machine tools, jigs,  
fixtures, etc.

Round and Oval plastic  
handles are supplied in  
red or black as wanted.

## MALL. MACH. HANDLES

Made in straight and  
offset as shown and in  
crank types. Many sizes.  
Smooth finish. Neat in  
appearance. Low prices.

**FREE 64 Pg.  
CAT.**

Listing scores of tool  
room needs such as hand  
knobs, compression  
springs, C.I. Hand wheels,  
etc.



Straight



Offset

**REID**  
TOOL SUPPLY CO.  
MUSKEGON HEIGHTS,  
MICHIGAN



For more data circle 562 on Postpaid Card  
modern machine shop 297

**new shop equipment . . .**

hard, tough, ferrous and non-ferrous alloys. Diameters are available from 12 to 20 inches with hole sizes to fit all standard floor stand and swing frame machines. Thicknesses range, according to diameter, from  $\frac{1}{8}$  to  $\frac{1}{4}$  inch.

For more data circle 133 on Postpaid Card

## **FAST DELIVERY on NOPAK shelf-stock AIR CYLINDERS!**

**Your choice of —**

- 6 Mounting Styles
- 8 Bore Sizes
- 9 Stroke Lengths

When you specify NOPAK "Shelf-Stock" Air Cylinders you save money 3 ways:

1. You eliminate waiting for "specials".
2. You reduce engineering costs.
3. You get top quality NOPAK Air Cylinders at the lowest possible prices.

NOPAK "Shelf-Stock" Air Cylinders are available in a wide range of bore sizes and stroke lengths from  $1\frac{1}{2}$ " x 1" to 8" x 15". No other manufacturer offers such a wide range of selection in Brass Tubing, Precision Machined, Cushioned Air Cylinders at comparable prices.

### **NOW! 5" BORE**

replaces the  $4\frac{1}{2}$ " bore in the NOPAK Shelf-Stock line, with no price change — extra cylinder power at no extra cost. Compare quality and prices, and you'll specify NOPAK. Write for Current Listings and Catalog 101.

GALLAND-HENNING NOPAK DIVISION • 2758 S. 31st St., Milwaukee 46, Wis.

## **NOPAK VALVES and CYLINDERS**

A-6-701-19

For more data circle 563 on Postpaid Card

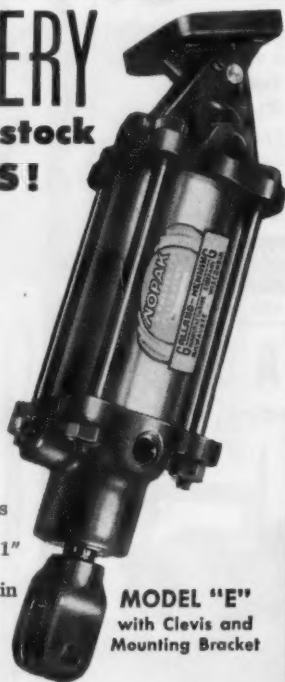
298 modern machine shop

## **SELF-ALIGNING TOOL MEASURES BORES AND HOLES**

Intrimik, the internal tri-point micrometer, is manufactured by Brown and Sharpe Manufacturing Co., Providence, R. I., to provide advantages in adaptability and convenience. One Intrimik is claimed to replace hundreds of plug gages because it is adjustable over a wide range of sizes. Three measuring points make line contact with

the surface, so that the instrument aligns itself axially and radially, eliminating the risk of missing the full diameter measurement. Measurements can be read directly, without any reference to a master.

Intrimiks are furnished as individual tools or in five sets with over-all ranges of from 0.275 inch to 8 inches. Extensions are obtainable to



**MODEL "E"**  
with Clevis and  
Mounting Bracket



**Brown and Sharpe  
Intrimik Micrometer**

December, 1957



MARK OF  
QUALITY

## STANDARD MACHINE RACKS

The Standard Steel Specialty Company, a pioneer in the machine rack field, has brought an accuracy and finish to this product that cannot be matched by any other company.

This rack is made from special machinery steel finished to our specification . . . cut by expert mechanics on machines designed especially for this work.

Send for our new catalog which gives information on Woodruff keys, taper pins, machine keys, and features a chart for checking machine racks.

**STANDARD STEEL SPECIALTY CO.**  
BEAVER FALLS • PENNSYLVANIA  
Plants: Beaver Falls, Pa.; Hammond, Ind.

For more data circle 564 on Postpaid Card

## HASSNER QUICK CHANGE PRECISION CHUCKS



**WHAT DO THEY OFFER YOU?**

- Superiority in PRECISION
- Tool Change can be made with spindle rotating up to 7000 RPM
- Shifting and slipping impossible; no chewed up tools

**ALL THIS MEANS BETTER WORK AND TIME SAVING,**  
thus increased profits

Sole U.S.A. Representative  
**KARL A. NEISE**  
404 4th Ave., Dept. MMS  
New York 16, N. Y.

**NEISE**  
MODERN TOOLS

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Write  
for  
Catalog.

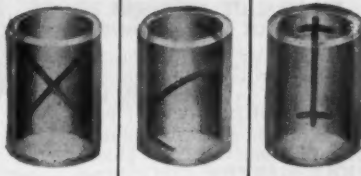
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Send parts  
for free  
grooving and  
production  
estimate

ESTABLISHED 1900

## FISCHER MACHINE CO.

ELEVENTH & WOOD STS. • PHILADELPHIA 7, PA.



## ... OIL GROOVERS

The FISCHER No. 1 Oil Groover cuts a wide variety of grooves in bearings up to 8" in length and up to 5" inside diameter. A few simple settings permit you to cut continuous, relieved, straight or spiral grooves at any angle from parallel to perpendicular to the work. Grooves may also be cut in shafts, housings, etc. This machine will slash grooving time and deliver continuous profitable production in your shop. It will pay to find out what it can do on your grooving jobs.

For more data circle 566 on Postpaid Card

## new shop equipment . . .

increase the depth at which measurements can be taken. Ring gages, for occasional checking and setting exact calibration, are also provided. The dull chrome finish facilitates reading, and high carbon, high chromium steel measuring surfaces resist wear.

For more data circle 134 on Postpaid Card

**Does jobs no drill can do...  
Does many jobs better!**



Produces round, true holes in CASTINGS, FORGINGS, BOILER PLATE, THIN SHEET STOCK, PIPE, TUBING, ETC.; Drills CROWNED, CYLINDRICAL, FLAT OR WEBBED SURFACES!

No triangular shaped holes, no grabbing on break-throughs, no "walking" on starts with the Clark "HOLE-MAKER"! Produces full-gauge holes from start to finish. Removable pilot guides HOLE-MAKER straight and true even on intermittent cuts. Will also use pilot drill.

Ideal production tool on TURRET LATHES, CHUCKING MACHINES, RADIAL DRILLS, DRILL PRESSES, PORTABLE ELECTRIC and PNEUMATIC DRILLS. Excellent for rough boring, finishing and trepanning. Cuts all ferrous and non-ferrous metals and other materials. Saves money, replaces large drill inventory... Bore castings, forgings, etc. 3 to 10 times faster than single pointing!

### ROBERT H. CLARK COMPANY

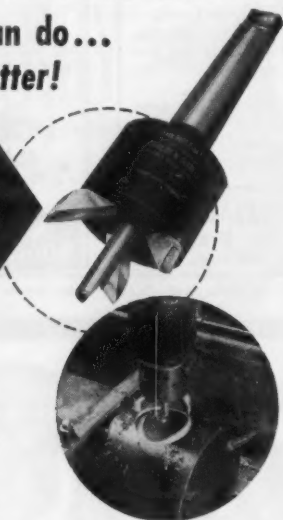
9330 Santa Monica Blvd., Beverly Hills, Calif.

For more data circle 567 on Postpaid Card

## DRILLING MACHINE

Retaining all of the rugged, easy operating and long life features of earlier models, the line of No. 15 Drilling Machines, Tappers and Accessories introduced by Buffalo Forge Co., 388 Broadway, Buffalo, N. Y., has several refinements in design, which facilitate operation, maintenance and flexibility.

The No. 15 Drilling Head achieves maximum ease of operation with a minimum of operator fatigue. Improvements include front mounted "start-stop" pushbutton switch; easily seen speed range table; depth gage, graduated for easier setting; and three grip spindle feed. The belt guard quickly tilts upward to simplify speed changes. The motor bracket is hinged so that the belt may be changed from one step to another on the pulleys, without hav-

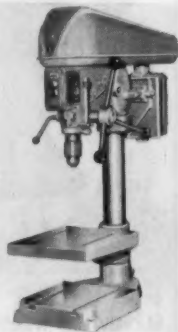


5 ADJUSTABLE SIZES COVER I.D.'s from 1" to 6"

Specify straight shank or MT 2, 3, 4. Other tapers on order.

MODEL	CAPACITY
102	1"-2"
203	2"-3"
304	3"-4"
405	4"-5"
506	5"-6"

When ordering, specify material to be cut.



Buffalo No. 15 Drill

## C A M S

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

**Your Inquiries Answered Promptly**

**HIMOFF MACHINE CO., INC.**

23-16 44th Road Long Island City 1, N. Y.

For more data circle 568 on Postpaid Card

## SUPERIOR® INDICATOR

**A Low-Priced Dial Type Indicator**  
Has 2 contacts 1/32" threaded within 1/8". Double Faced. Reads front and back. Two Crystals. Double faced dial indicator complete with plated holder including 1/32" and 1/8" contacts —

Superior Indicator #50...\$8.95

Superior Indicator #75X

with Universal Swivel...\$10.95

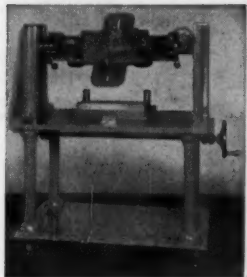
Thousands of satisfied customers!

**SUPERIOR INDICATOR CO.**

P. O. Box 734, Rochester 3, N. Y.



For more data circle 569 on Postpaid Card



## HAUSER Die Handler

**For tool rooms, inspection, press and try-out departments.**

Mobile or stationary. 180 degrees rotation of punch. Locks in any position. 24" x 40" base table. Ball bearing construction.

Dealer inquiries invited.

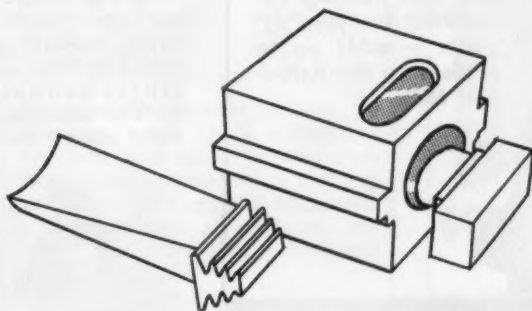
**WRITE FOR DETAILS**

**HAUSER MFG. CO.**

234 MILL STREET  
ROCHESTER 14, N. Y.

For more data circle 570 on Postpaid Card

## Hold irregular workpieces rigidly by nesting them in **CERRO ALLOYS**



The unique combination of low melting temperature and non-shrinking qualities in CERRO ALLOYS make them an excellent nesting matrix in jigs, chucks and fixtures for irregular shaped pieces. The illustration shows how a jet engine "pinetree" turbine bucket can be held snugly in a special fixture for grinding. After locating the bucket properly in the large cylindrical hole, the latter is filled with molten Cerro Alloy. After grinding the bucket, it is removed from the fixture by melting out the matrix in hot water. In such applications the low melting temperature of the Alloy eliminates all danger of annealing or burning the workpiece.



Send for further information.

**CERRO DE PASCO SALES CORPORATION**

304 Park Avenue, New York 22, N. Y.

For more data circle 571 on Postpaid Card

**new shop equipment . . .**

ing to adjust the motor bracket. The proper belt tension is automatically maintained.

The manufacturer claims that no tools are needed for adjustments of the head and table.

Newly designed bench and floor bases eliminate grease and dirt catching troughs and pockets around the work area.

The complete line of No. 15 Drills includes bench, floor and pedestal models. Bench and pedestal types are available in one to six spindle models. No. 15 Attachments are available for tapping, mortising, routing or back spotfacing.

The Buffalo No. 15 Drilling Machines are claimed to be unusually sensitive, thereby assuring excellent results for small hole drilling. The manufacturer states that they also have sufficient rigidity and weight to operate at full capacity without undue strain or wear.

For more data circle 135 on Postpaid Card

★ ★ ★

**DOUBLE  
ACTING  
RETRACTABLE  
CLAMP**

Lodding, Inc., Worcester 1, Massachusetts, has recently announced production of a double acting retracting clamp that delivers pressure in two directions simultaneously. The manufacturer claims that



**Lodding Double Acting Retractable Clamp delivers pressure in two directions at once**

**ARROW TOOL & REAMER CO. • Established 1916**



*Arrow*  
means a complete  
**LINE OF END MILLS**

**THIS IS  
Arrow's  
3  
FLUTE  
END MILL**

**Manufacturing skill and tool making experience for over 37 years — adds up to preference for Arrow End Mills.**

**ARROW TOOL & REAMER CO.**  
711 Stephenson Highway  
P. O. Box 338 • Troy, Michigan

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DO YOU NEED  
BORES LIKE THIS?



**Comet. LOW COST**

**High Speed Steel  
STEP DRILLS**  
are the  
answer!



Made to  
Your Own  
Specifications  
**PROMPT SERVICE**

Write for Complete Data

**COMET Tool Co.**

738-53 Broadway  
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**FROIL Rust Preventive  
OIL**



Positive barrier against corrosion  
that lasts for MONTHS

Protects any metal—even delicate  
MICRO-finishes

Eliminates fingerprint damage and  
water spotting.



Write for Data Sheet No. RP-100  
"FROIL FOILS RUST"

PROCESS

15 BANK STREET  
STATEN ISLAND 1, N. Y.

For more data circle 574 on Postpaid Card

**NON-ROTATING SPINDLE  
BLADE TYPE  
MICROMETERS**



Spindle moves  
but does not  
turn!

Available  
Carbide-tipped

Graduated in .001"

Ranges:  
0-1", 1-2", 1 1/2-2 1/2",  
2 1/2-3 1/2", 3 1/2-4 1/2",  
and others

Sold thru Tool Supply Houses

**GEORGE SCHERR CO., INC.**

For Measuring of narrow depth grooves,  
slots, keyways, splines, square threads, recesses  
and similar "hard-to-measure" surfaces.

Minute micrometer movements without damage to fragile surfaces  
BLADE THICKNESS .030" GAGING DEPTHS TO 1/4"  
Spindle and Anvil Blades are hardened, ground and lapped to contact fit

**NON-ROTATING SPINDLE  
BLADE TYPE  
MICROMETER HEAD**

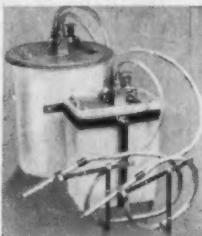


...to be built into  
fixtures, machine tools,  
delicate instruments and cross-slides.

WRITE FOR ILLUSTRATED FOLDER Code-GIFUX

200-MM LAFAYETTE STREET • NEW YORK 12, N. Y.

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**NOW ...  
GRAYMILLS  
offers  
MIST  
COOLANT  
at its best.**

Graymills Mist Coolant Systems are  
corrosion proof. DUAL outlets are  
standard. Fine spray for maximum  
cooling and air economy. 1 and 2 1/2  
gal. sizes. Polyethylene containers  
show liquid level at all times. For  
drilling, tapping, milling, sawing and  
tool grinding jobs.

Write for new folder.

**THE GRAYMILLS CORPORATION**

3769 N. Lincoln Ave., Chicago 13, Ill.

For more data circle 576 on Postpaid Card

December, 1957



**CONTINUOUS HINGES**

Manufactured by

**AUTO MOULDING  
& MFG. CO.**

WRITE FOR CATALOG

1114 E. 87TH ST.

CHICAGO 19

For more data circle 577 on Postpaid Card

modern machine shop 303

## new shop equipment . . .

this is the first clamp in a standard line that will eliminate the use of two clamps for various types of holding. This development is made of hardened forged steel and is available in three types of operation — hand knob, nut and hand cam.

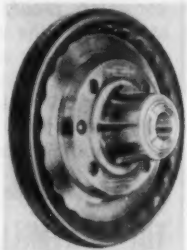
For more data circle 136 on Postpaid Card

## CAPACITY AND PRODUCTION OF COLLET CHUCKS ARE INCREASED

Increased capacity from 25 to 40 percent and greater precision production are advantages claimed for Hardinge-Sjogren Speed Collet Chucks, recently announced by Hardinge Brothers, Inc., Elmira, N. Y. Designed for use on all types of toolroom lathes, engine lathes and grinders, this

Hardinge-Sjogren Chuck augments the company's complete line of chucks, collets and closers which are available in all sizes and adaptable to all types of machine shop requirements.

Included in the features of this chuck is the accurate holding of any bar that can be passed through the spindle without a cumbersome draw tube and adapter or sleeve inside the spindle hole found on ordinary collet



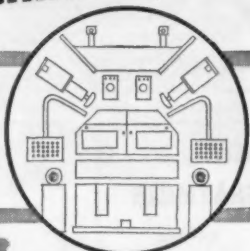
Hardinge - Sjogren Speed Collet Chuck

**SIMPLE AS ABC...**

the **STANDARD** **BUILDING BLOCK**

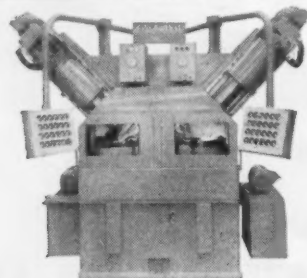
**TECHNIQUE OF MACHINE DESIGN**

FORD wanted a machine to finish grind in excess of 100 impeller housings and 100 covers an hour. Frauenthal Division—Kaydon was given the job.



They put the machine together "building block" style...AND SPECIFIED TWO STANDARD SUPER PRECISION SPINDLES. The machine is working right now...turning out 138 pieces an hour on each side, at 80% efficiency.

Standard's new catalogues on Spindles, Slides and Feeds is a handbook of special machine components...with complete working drawings, dimensions and capacities. WRITE FOR YOURS TODAY!



America's most complete line of super precision spindles; also slides, feeds and tables. Spindles—motor driven and independent drive— $\frac{1}{4}$  H.P. to 200 H.P.

SUPER PRECISION SPINDLE DIVISION  
SINCE 1912  
the **STANDARD** electrical tool co.

**STANDARD SETS THE PACE!**

2487 RIVER ROAD • CINCINNATI 4, • OHIO

For more data circle 578 on Postpaid Card



MADE IN THE U.S.A.  
THROUGHOUT THE WORLD

# KEO

## WOODRUFF KEY SEAT CUTTERS



High speed steel. Arbor type. Correct dimensions for Woodruff Keys, with  $\frac{1}{32}$ " oversize O.D. to permit re-sharpening. Regularly furnished without clearance on side teeth.

For quality, price and service investigate KEO combined drills and countersinks, T-slot cutters, center reamers and lathe mandrels. Big stocks for fast delivery.

Write, Wire or Phone for illustrated literature  
Jobbers' Inquiries Invited

### KEO CUTTERS, INC.

25040 Easy Street, P.O. Box, Roseville, Mich.

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## TRY "Standard" DIE MAKERS GREASE AT OUR EXPENSE

By actual independent laboratory test, this grease has proved to have lubricating qualities unequalled by any other lube. Write on your company letterhead for FREE sample tube.

STANDARD DIE SET MFRS., INC.  
1503 Elmwood Ave., Providence 7, R. I.

## B.S.A. CHUCKS MEDIUM DUTY • PRECISION MADE IN ENGLAND



**MODEL 580**  
Self - centering  
Geared Scroll  
UNIVERSAL •  
Three Jaws

Includes 1 set External Jaws, 1 Key,  
1 set Internal Jaws,  
3 Pinions, 3 Bolts.



**MODEL 550**  
4-JAW INDEPENDENT CHUCK

Includes 4 operating screws, 4 Reversible Jaws, 4 Bolts, 1 Key.

Order Today

IMMEDIATE SIZE	DELIVERY WEIGHT (lbs.)	CHUCK BORE	PRICE
3"	3 1/2	3/4"	\$ 35.75
4"	8	1"	35.75
5"	12	1 1/4"	41.50
6"	17 1/2	1 3/8"	48.00
7 1/2"	29	2"	56.50
9"	42	2 1/2"	71.50
10 1/2"	62	3"	88.50
12"	88	3 3/4"	120.00
15"	143	4"	180.00
18"	200	4 1/2"	261.00
21"	262	4 1/2"	320.00
24"	324	4 1/2"	390.00

SIZE	WEIGHT (lbs.)	CHUCK BORE	PRICE
4 1/2"	8	1"	\$ 30.50
6"	16	1 1/8"	35.00
8"	34	1 3/4"	51.00
10"	60	2"	62.50
12"	80	2 3/4"	74.50
14"	98	3"	84.00
16"	126	3 1/2"	105.00
18"	166	4"	140.00
20"	204	4 1/2"	165.00
22"	246	5"	205.00
24"	322	5 1/2"	220.00
30"	490	5 1/2"	340.00

Dept. B, 251 Centre St.  
NEW YORK 13, N. Y. CANAL 6-5575

**VICTOR MACHINERY EXCHANGE, INC.**  
Dealers in Tool Room Equipment

For more data circle 580 on Postpaid Card

## new shop equipment . . .

attachments. A full range of collet tension, from light to heavy holding power, is possible without keys or wrenches. The Hardinge-Sjogren Chuck uses regular steel collets for maximum efficiency and minimum cost. Complete operation from front position is possible with the hand-

wheel or lever operated type Hardinge-Sjogren Chucks.

Handwheels are supplied in either 7 $\frac{1}{4}$  or 10 inch diameters.

For more data circle 137 on Postpaid Card

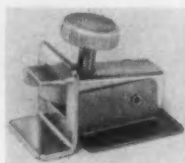
★ ★ ★

## AIR TIGHT FASTENER

A compression type fastener, for use where doors must be sealed against a gasket, has been introduced by the

Torit Manufacturing Co., Dept. 701, 296 Walnut St., St. Paul 2, Minn. Originally designed for doors on industrial dust collectors where the seal must be dust tight, the fasteners can be used for any air tight, light proof or vibration resistant application. Although the units, designated as No. 25 Fasteners, have been produced primarily in the past for the company's own use, they are now commercially available.

The fastening unit, cadmium plated, consists of



View of Torit Air-Tight Fastener

# WILL STAMPINGS



# DO YOUR JOB BETTER ?

Material:  
1100 Aluminum— $\frac{3}{8}$ " Thick

## Redesign from casting to stamping cuts piece price 66%...tooling cost 53%

- ★**BREAKAGE ELIMINATED**—Wrought aluminum alloy gives greater strength characteristics, eliminating breakage which occurred with the original cast part.
- ★**MACHINING ELIMINATED**—Blanked and pierced part is complete as pictured. No additional machining of holes or top and bottom surfaces is required. End result is a better part at lower cost.
- ★**COST REDUCED**—Piece price reduced 66%. Original cost of the casting plus necessary machining was \$1.45 each in lots of 1000. Cost of stamping is 50¢ each.  
Tooling cost reduced 53%. Original cost of pattern and drill jig was \$301.00. Tooling for stamping cost \$140.00.

### WILL STAMPINGS DO YOUR JOB BETTER?

Analyze your production parts and check with...

**DAYTON ROGERS**  
*Manufacturing Company*

MINNEAPOLIS 7D, MINNESOTA

For more data circle 581 on Postpaid Card

a sliding, pivoted latch which is tightened down under the compression action of a thumb screw.

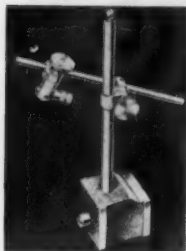
For more data circle 138 on Postpaid Card

★ ★ ★

## VERSATILE MAGNETIC BASE INDICATOR HOLDER

A new model of the Starrett No. 657 Magnetic Base Indicator Holder has been introduced by The L. S. Starrett Co., Athol, Massachusetts. It holds all types of dial indicators, including rack and pinion models with lug type backs, as well as the Starrett No. 196 Indicator and No. 711 Last Word Indicators.

This indicator holder, designated as the No. 657AA, is furnished with the company's No. 657 Magnetic Base which features a powerful permanent magnet and a large diameter pushbutton for turning the magnetic force on



Starrett Magnetic Base Indicator Holder

or off. The pushbutton permits placing the indicator holder with one hand while the other is free to position the indicator.

In addition to the magnetic base, the Model 657AA includes: a  $\frac{3}{8}$  inch diameter upright post; a sleeve which holds the stem of a No. 196 Indicator and can be positioned at any height on the upright post; a sleeve which can be positioned along the length of the rod; and an indicator attachment

## LUBRICATION ECONOMY

### "With LUBRIPLATE LUBRICANTS No Bearing Loss For An Entire Season"

says Cotton Gin and Oil Mill Manufacturer

**ALSO MAKES CARS  
AND TRUCKS RUN BETTER  
AND LAST LONGER**



LUBRIPLATE H.D.S.  
MOTOR OIL... THE OIL  
THAT NEEDS NO  
ADDITIVES



"After extensive testing of many greases, we found that LUBRIPLATE Lubricants were the only ones that stand up under all operating conditions throughout an entire season without loss of a single bearing."

1. LUBRIPLATE reduces friction and wear.
2. LUBRIPLATE prevents rust and corrosion.
3. LUBRIPLATE is economical to use.

Write today for case histories of savings made through the use of LUBRIPLATE in your industry.

LUBRIPLATE DIVISION  
Fiske Brothers Refining Co.  
Newark 5, N.J.—Toledo 5, Ohio

*The Different  
LUBRICANT!*

DEALERS EVERYWHERE, consult your Classified Telephone Book

For more data circle 582 on Postpaid Card

**new shop equipment . . .**

which holds Nos. 81, 25, 655 or 656 Lug Back Indicators. No. 711 Last Word Indicators are mounted directly on the  $\frac{1}{4}$  inch diameter rod by means of the body clamp furnished with these indicators. All working surfaces of the base are precision ground.

Non-working surfaces have a fine wrinkle finish.

A vee step across the top of the base adapts for mounting on horizontal or vertical arbors.

A tapped hole on one side provides a second mounting position for the upright post.

Dimensions of the base are: 1-15/16 inches high by  $1\frac{1}{8}$  by  $1\frac{7}{8}$  inches.

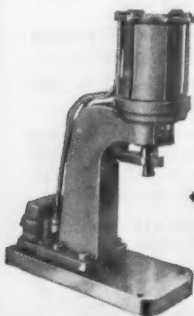
For more data circle 139 on Postpaid Card

★ ★ ★ ★ ★

# SAVE!

## WITH A HANNIFIN AIR PRESS

It's the ideal press for that occasional pressing job. These presses operate off ordinary shop air supply. They're fast and safe. Over 30 models to choose from...many for either bench or floor mounting. Capacities from  $\frac{1}{2}$  to 18 tons. Daylight to 46 inches...reach to 12 inches. Prompt delivery.

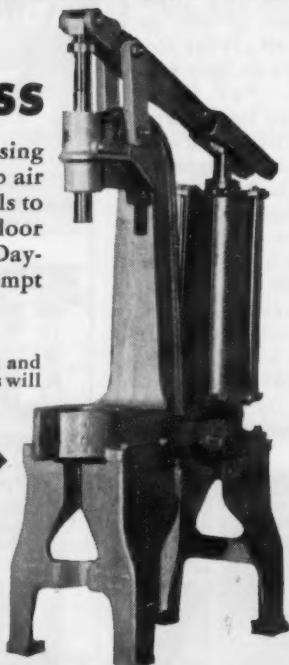


WRITE. Complete information and prices on Hannifin Air Presses will be sent on request.

6 Tons (Model B-2) One of more than 30 models. Press with base, \$570. ➔

◀ 1-ton Hand-D-Press. For small parts manufacturers. Press only, without valves, \$230.

Prices F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



# HANNIFIN

HANNIFIN COMPANY, 565 S. WOLF ROAD, DES PLAINES, ILLINOIS

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**THE TWO IN ONE**



**COMBINATION  
ROTARY TABLE  
AND  
ANGLE PLATE**

**PRECISION  
ACCURACY**

**WORM adjustable from  
0 to 90  
degrees.**

**VERNIER  
control to  
within  
2 seconds of Arc.**

**WRITE FOR FOLDER**

Makers of Helical Gear Speed Reducers.  
Worm and Gear Speed Reducers. Stand-  
ard and Special Gears. Wedge-Lock  
Turret for Lathes and Turret Lathes.

Open territory available to representatives

**OLSON INDUSTRIAL PRODUCTS, INC.**  
40 W. WATER ST. • WARFIELD, MASS.

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**ACCURATE—LOW COST  
SINE BARS and PLATES**

**5" Sine Bar  
only  
\$26.50**



- Guaranteed Accuracy
- Precision Ground
- Hardened Rails
- Double Normalized
- Tapped Holes
- End Plates
- Solid Oak Case Extra
- Immediate Shipment

**Sine Plates and Bars**

No.	Cent. Dist.	Width	Price	With Oak Case
1605	5"	3"	39.95	45.50
1610	10"	5"	87.50	95.00
1705	5"	1"	26.50	30.75

FOB St. Paul.

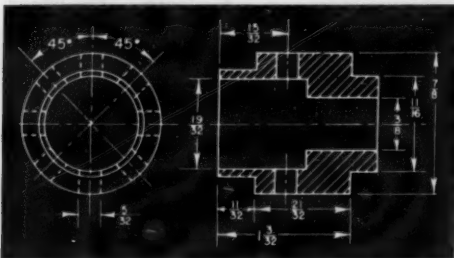
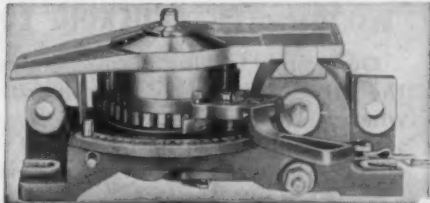
Accurate to .0002" in center distance and parallelism for the length of the tool. Order Today—from your dealer or direct.



**Bald Eagle Corporation**  
(Formerly Bald Eagle Tool Company)  
356 Cedar St. St. Paul 1, Minn.

For more data circle 585 on Postpaid Card

**CUT COSTS  
ON SECONDARY OPERATIONS  
WITH THE  
DEARBORN  
AUTOMATIC CHUCKING  
AND INDEXING FIXTURE**



This piece was made from Brass. It was necessary to drill all holes from the outside to minimize the burring time. Production was about 100 pieces per hour or 800 holes per hour.

**Features:**

1. Work held by collets
2. Automatic opening and closing
3. Work automatically ejected
4. Automatic indexing if required
5. Three models with capacities from 1/32" to 2"

Write for illustrated data.  
Send blueprints or specifications  
of work.

**J. W. DEARBORN**  
ANSONIA • CONN.

For more data circle 586 on Postpaid Card

**new shop equipment . . .**

## **HIGH SPEED UTILITY DRILL FOR PORTABLE DRILLING**

Being of rigid design and sturdy, the high speed utility drills recently introduced by Chicago-Latrobe, 419 West Ontario St., Chicago 10, Ill., will withstand considerable strain and will drill successfully where full length



**Chicago-Latrobe High Speed Utility Drill**

drills may fail. They are recommended for drilling truck and automobile bodies, sheet metal, stainless steel and for general purpose drilling.

Points are split with 1.350 angles which make the drill start right in and not walk; a most satisfactory drill for sheet metal type of work.

These drills are available in right or left hand fractional sizes of 3/64 through 1/2 inch and wire gauge sizes 1 through 60. For more data circle 140 on Postpaid Card



## **WITH WOODWORTH CHUCKING EQUIPMENT**

Our tough looking character who is holding the little bird clearly demonstrates one fact: whenever you are holding *anything* it should be secured with gentle firmness. And this is so true when considering chucking equipment.

Your best machine will produce only as accurately as its work-holding device permits and Woodworth manufactures the most rugged, accurate and dependable chucks for precision machining in America.

We invite your inspection and consideration of N. A. Woodworth products. There is a Woodworth Sales Representative in your area and a letter to the N. A. Woodworth Company will place him promptly at your service.

# **WOODWORTH**

**1300 EAST NINE MILE ROAD  
DETROIT 20, MICHIGAN**

For more data circle 587 on Postpaid Card

310 modern machine shop

★ ★ ★

## **INSERT**

A Tap-Lok Insert, known as the H-Series, has been introduced by the Groov-Pin Corp., 1135 Hen-



**Tap-Lok Insert**

December, 1957

**GRANT****RIVETERS**

• Pioneers in the riveting field. Head rivets from smallest to  $\frac{3}{4}$ " diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

**THE GRANT MFG. & MACHINE CO.**  
96 Silliman Ave. Bridgeport 5, Conn.

For more data circle 588 on Postpaid Card

**NIBBLE***Your* **COSTS**

WITH...

**SAVAGE  
NIBBLING MACHINES**

- TUBE CUTTING
- CIRCLE CUTTING
- STANDARD NIBBLING
- FREE-HAND or  
TEMPLATE CUTTING
- SPEED WITH ACCURACY  
NO SECONDARY OPERATIONS
- SPEED WITH SAFETY  
NO OPEN FLAME OR SPARKS



Up to  $\frac{3}{4}$ " Capacity  
in MILD STEEL

QUOTATION ON REQUEST

**W.J. SAVAGE COMPANY**

KNOXVILLE  TENNESSEE

**NIBBLING MACHINE PIONEERS**

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*Proved* **BETTER FOR  
TAPPING AND REAMING**

Used over a period of many years by leaders in the metalworking field, the Ziegler Floating Tool Holder has demonstrated itself to be an unquestionably superior holder for tapping and reaming operations.

One of its outstanding advantages is that by automatically compensating for inaccuracies in alignment up to  $1/32$ " radius (or  $1/16$ " diameter), the Ziegler makes possible perfect work in spite of carelessness on the part of the operator.

Try this proven way of getting better results in tapping and reaming. It may be the solution to your production problems.

**PROMPT DELIVERY**



Types to fit  
any machine  
used for  
tapping or  
reaming.

*Ziegler*  
ROLLER  
DRIVE

**W. M. ZIEGLER TOOL CO.****FLOATING HOLDER***for Taps and Reamers...*

13566 AUBURN

DETROIT 23, MICH.

• **WRITE FOR  
CATALOG** •

For more data circle 590 on Postpaid Card

December, 1957

modern machine shop 311

## new shop equipment . . .

dricks Causeway, Ridgefield, N. J., to meet the exacting requirements of the aircraft industry.

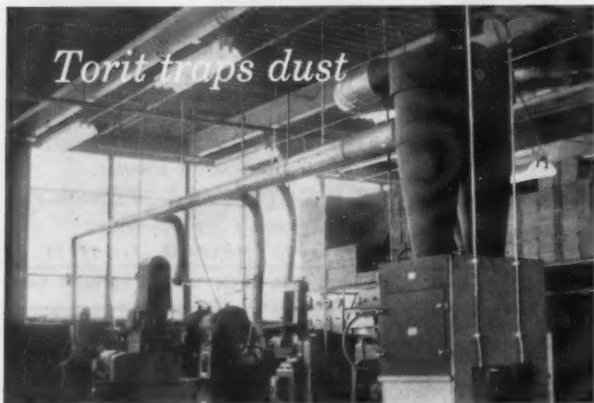
Design features of the insert include: (1) three holes in the pilot provide a balanced thread cutting action; (2) truncated external thread roots give

20 percent more wall thickness with proportionate increase in insert strength; and (3) internal threads are supplied the full length of the inserts to Class 2B or 3B specifications, as required. The inserts work on the same self-tapping principle as the regular Tap-Lok Insert. They are installed into a drilled or cored hole with a special driver, using a standard drill press and tapping head or a tapping machine without a lead screw. Adequate

chip flow is provided while the insert is cutting its thread into the base material. The driver provides a quick low torque release action between the insert and driver at the moment of reversal.

The H-Series Tap-Lok Insert is furnished in three standard lengths in case hardened cadmium plated steel or stainless steel — for self-tapping into aluminum, magnesium and other structural materials. It accommodates standard threaded fasteners without danger of stripping and withstands vibration without loosening. It has maximum pull-out strength limited only by the nature of the base material.

For more data circle  
141 on Postpaid Card



## Six machines protected from dust by Torit for **\$666<sup>15</sup>**

This Torit Dust Collector, Model 219FM, complete with accessories, was installed by the Mohr Lino Saw Co., Skokie, Ill., to protect 3 belt sanders and 3 other grinders (2 grinders hidden from view) from destructive dust—at a total cost of just \$666.15!

After one year's operation, Mohr Lino Saw says this about their *low-cost* Torit installation: "The Torit installation has kept our shop *cleaner*, our operators *happy*, and *protected vital machinery*."

You too can achieve greater machine protection and cleaner working conditions by trapping dangerous or valuable dust *at its source* with a completely *self contained* and *portable* Torit Dust Collector. For full details write to:

### TORIT MANUFACTURING CO.

Dept. 703, 311 Walnut Street, St. Paul 2, Minn.

For more data circle 591 on Postpaid Card



## JIG BORING

and

**Large Precision Machining**

Done to your specifications

**We have 22 Jig Borers**

**KIDDE PRECISION TOOL CORP.**

15 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 592 on Postpaid Card

## HARGRAVE CLAMPS

Complete Line of Clamps for all Purposes

Individually  
Power Tested  
for Better  
Performance.



"C", Steel Bar,  
Quick Acting,  
Wood Hand  
Screws, Welders

**WRITE FOR FREE CATALOG.**

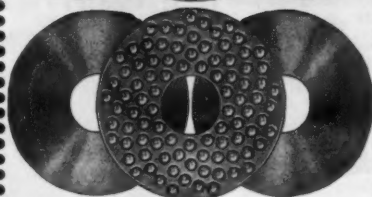
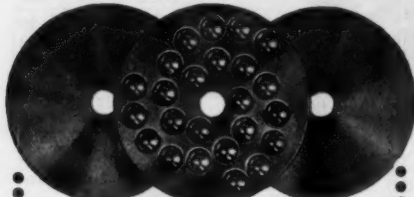
Showing Clamps, Chisels, Punches, Masonry Drills  
for hand and power hammers, Carbide Drills,  
Washer Cutters, and File Cleaners.

Stocked by Your Local Distributor.

**THE CINCINNATI TOOL COMPANY**

1947 Waverly Ave., Cincinnati 12, Ohio

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## BALL THRUST BEARINGS

STANDARD SIZES ARE SHOWN IN OUR  
GENERAL CATALOG, SENT UPON REQUEST.

*Serving Industry for Over 44 Years.*

**THE GWILLIAM COMPANY**

INCORPORATED 1912

358 FURMAN ST.

BROOKLYN 1, N. Y.

For more data circle 594 on Postpaid Card

December, 1957

## NOW 2-DIMENSIONAL PROFILING ON ANY VERTICAL MILLER!



WITH THE NEW

## REGENT R-200

FLUID MOTION

## DUPLICATOR TABLE...

Fastest method of Profile Milling

Tighten just 4 bolts and R-200  
is mounted on any vertical miller!  
It combines all the extreme sensitivity  
of true fluid motion with the extra  
rigidity of its base-casting-  
mounted follower arm.

Single lever control enables  
inexperienced operators to produce  
intricate contoured parts.  
Rugged adjustable friction brake.  
Table "floats" on ball-bearings  
in circular raceways.

Capacity: 6" x 6"  
1 to 1 ratio with master

WRITE FOR  
LITERATURE

## J. M. Kalins & Co.

1575 Railroad Avenue, Bridgeport 5, Conn.

For more data circle 595 on Postpaid Card

modern machine shop 313

**new shop equipment . . .**

## **SMALL OFFSET WIRE BAR AND TUBE PRINTER**

The Pannier Corp., 525 Sandusky St., Pittsburgh 12, Pa., has announced a smaller Offset Wire Bar and Tube Printer, especially designed to handle material from 1/4 inch to 4 inches o.d. without changing guide wheels. The

power unit has a magnetic starter that activates the motor as material passes through the open limit switch. This eliminates any excessive build-up of ink on the offset printing wheel and assures clean, clear marking. The printer is available as either left or right hand feed, so that it fits into conveyor line systems, without disrupting present line movements.

This unit will print a continuous message set on a 24 inch offset print-

ing wheel in type sizes from 1/16 to 1 inch. The manufacturer recommends Pannier 1001 S Ink for metal marking with this unit. A 1/2 h.p., three phase, variable speed motor chain drives, with a floating idler sprocket, only the marking head to forward material through the unit with an extremely light printing pressure. Speed can be safely controlled from a



**FEED UP TO 12"**  
**PER PRESS STROKE!**

*new!*

Send for literature—have a Dickerman Representative call. Would you like a demonstration on *your* material?

**Never before such  
press feeding ACCURACY . . .  
such simple compactness!**

A "standard" off-the-shelf Rol-Di-Feed so versatile, so economical, it will save hundreds of dollars—do the most rugged press feeding jobs without wonder, worry or waste!

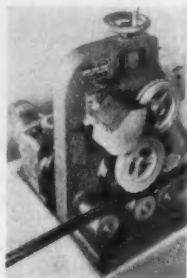
Compact—YES! . . . feeds front to back, back to front, right to left, left to right—and *diagonally!*

That's Versatility plus! A new 12" feed, a new feeding principle, a new profit in *your* press feeding operations!

# **Dickerman**

**H. E. DICKERMAN MFG. CO.**  
321-324 Albany St. • Springfield, Mass.

For more data circle 596 on Postpaid Card



**Pannier Offset Wire  
Bar and Tube Printer**



# CAMS

MADE TO YOUR SPECIFICATIONS

—Except Screw Machine Cams—

Design Assistance Offered

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE, ROSELAND, N. J.

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## GEARS

In Stock—Immediate Delivery

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.

Send for Complete Catalog No. 20

CHICAGO GEAR WORKS

440-50 N. Oakley Blvd., Chicago 12, Ill.

For more data circle 598 on Postpaid Card

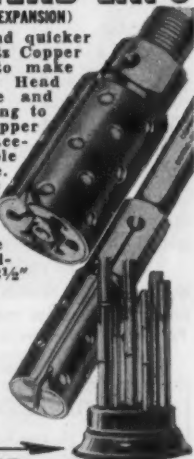
## Boyar-Schultz COPPER HEAD LAPS

(STANDARD and EXPANSION)

It is less costly and quicker to use Boyar-Schultz Copper Head Laps, than to make your own. Copper Head Laps are accurate and rapid to use. Nothing to wear out but the copper sleeve which is replaceable and adjustable to the correct size. Adjustment permits maintaining lapping size till worn out and replaced with new ones. Available from stock in standard sizes,  $\frac{1}{8}$ " to  $2\frac{1}{2}$ " diameters.

### SPECIAL TOOL MAKERS BENCH LAP SET

Consists of seven most commonly used sizes —  $\frac{1}{8}$ " -  $3/16$ "  
 $\frac{1}{4}$ " -  $5/16$ " -  $\frac{3}{8}$ "  
 $7/16$ " -  $\frac{1}{2}$ ", with enameled die cast base.



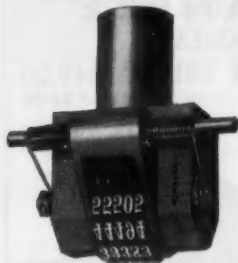
BOYAR-SCHULTZ CORPORATION

2020 South 25th Ave., Dept. F-1, Broadview, Ill.

For more data circle 599 on Postpaid Card

## NUMBERALL

CUTS THE COST OF STAMPING NUMBERS



MODEL 50 Automatic Numbering Head. Write for catalog MS-50.

MS-70. We also make other numbering heads, non-automatic, with quick-set wheels. Write for catalogs MS-80 & MS-85.

The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL machines are used in all industries to mark various parts. Stamps numbers, etc., quickly . . . neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20. Can be furnished in  $1/32$ " to  $3/8$ " high figures, sharp face gothic or shaded roman style. Write for Bulletin



NUMBERALL STAMP & TOOL CO.

HUGUENOT PARK STATEN ISLAND 12, N. Y.

Hand shank Model 70 illustrated. Press shank for foot or power presses also available.

For more data circle 600 on Postpaid Card

## new shop equipment . . .

minimum of 45 lineal feet to a maximum of 450 lineal feet per minute. Material being marked is supported by three fibre rolls that are not powered. The standard support rolls are designed primarily for round material, but will handle a great variety of shapes; some extruded shapes may require special support rolls to assure clean, smudge free impressions.

This same unit is also available as a friction operated unit for use with continuous flow materials.

For more data circle 142 on Postpaid Card

### CENTERLESS GRINDING

Brown & Sharpe and Swiss Automatic screw machine parts, aircraft and standard, heat treated and ground if necessary. Send blue prints for estimates. 27 years serving industry. The Porter Machine Co., Cincinnati 9, Ohio.

For more data circle 601 on Postpaid Card

## BINARY CODE TAPE CONTROL SYSTEM FOR BORING, DRILLING AND MILLING MACHINES

The Kaukauna Machine and Foundry Division, Giddings and Lewis Machine Tool Co., Kaukauna, Wis., has developed a binary code tape control system for use with its line of floor type horizontal boring, drilling and milling machines. The basic machine tool has a 5 inch spindle with 72 inches of vertical travel of the headstock column and 120 inches of horizontal travel of the column on the runway.

Three types of control are available; namely, manual electric, digital dial and binary code tape. Under manual control, three buttons govern the spindle operation; right, left and stop. Two pushbuttons are provided for rapid traverse and positioning of the headstock on the column. Each is a dual position button and fully depressing it puts the machine in rapid traverse at 100 inches per minute. With this control the standard ma-

## GRIND: RADIUS—ANGLE

QUICKLY

**RADIUS DRESSER \$44.00**

Diamond \$8.00



### Chatter Resistant, Spring Loaded Spindle

Hardened shaft—bearing adjustable for wear.

Diamond always perfectly centered.

Easily set adjustable 180° steps.

All surfaces ground true from hole.

CAPACITY—1½" convex to 4" concave.

10" Wheel size for DoALL and NORTON Grinders—\$49.00. Diamond \$8.00.

14", 20", 24", in stock, low price.

EASILY

**ANGLE DRESSER \$49.00**

Diamond \$8.00



Ball Thrust Bearing.—

24 Precision Ground Surfaces.—DIAMOND BLOCK Slides In Ground & Lapped Housing, Can't Chatter.—Set Accurately With Protractor or Sine Bar.—Largest Bearing Surfaces of Any Angle Dresser.

ORDER DIRECT  
on our 10 day  
money back  
guarantee

### The "Mighty Midget" Line

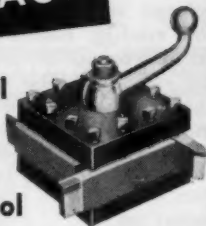
SPERMAN METAL SPECIALTIES • 2199 E. 21st ST. • BROOKLYN 29, N. Y.

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**+ .0005  
- ACCURACY**

**Here's Real  
Precision**

**Plus  
Multiple Tool  
Efficiency**



## ENCO TOOL POST TURRETS

Boost lathe production, cut costs, reduce tool switching and re-checking, cut set-up time, with ENCO 12-station tool post turrets! Holds 4 maximum size tools . . . 3 working positions each. Sturdy and rigid for hogging cuts, yet unsurpassed for close-tolerance work.

**ON-THE-BALL**

**RE-INDEXING**

Spring loaded balls locked between perfectly milled spherical seats provide consistent re-indexing accuracy. "On the ball" every time!

*There's an ENCO turret for every lathe.*

Mail coupon for cat. #53 and name of nearest Enco Franchise Dealer.

**ENCO Mfg. Co.**  
4520 W. Fullerton  
Chicago 39

ENCO Manufacturing Co.  
4520 W. Fullerton,  
Chicago 39. Dept. 1127

Please send catalog #53 and full details of ENCO 12-station tool post turrets.

Name \_\_\_\_\_

Firm \_\_\_\_\_

Address \_\_\_\_\_

For more data circle 603 on Postpaid Card  
December, 1957



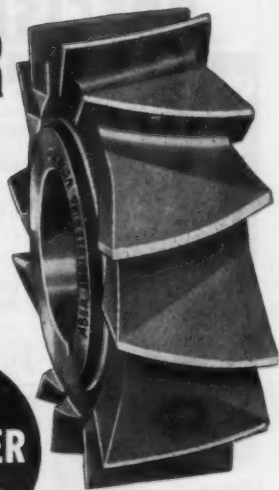
**EXTEND  
CUTTER  
LIFE**

**Shear Metal**

*with*

**ABER**

**CURVED  
TOOTH  
milling  
cutters**



**END  
CHATTER**

- Give More Accurate Control of Limits and Finish • Elimination of Chatter and Breakage • Extended Cutter Life • Better Performance • Increased Production

**FREE DATA** — 24 page catalog on milling with ABER Cutters.

**ABER ENGINEERING  
WORKS**

WATERFORD WISCONSIN

For more data circle 604 on Postpaid Card  
modern machine shop 317

## new shop equipment . . .

chine can be positioned to one thousandth of an inch. Identical pushbuttons are provided to control the movement of the column along the runway. Feeds and speeds are manually dialed. Shifting is accomplished automatically by electro-hydraulic power.

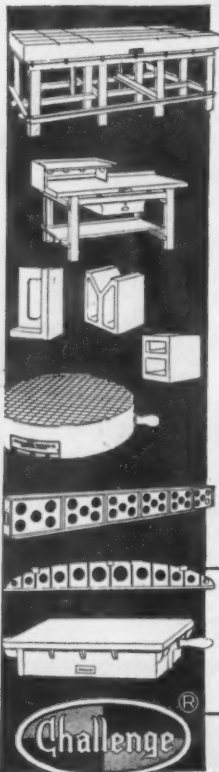
The machine can also be operated through a dial input system of discrete

dimensional data. By moving the selector switch to dial, the electronic control panel is activated and the machine is ready to be positioned and run. Dimensional data, directly from the print, is dialed into the head and column turrets provided. Depressing the "read-in" button transfers the dialled dimensions to visual light numbers for checking. This operation sets up the electronic circuit to control the machine. The operator then depresses

the automatic traverse button and the machine positions to the desired dimension. As the machine comes into position, two electronic verniers indicate to within 0.0001 inch the accuracy with which the machine has positioned itself. While machining at this location, the operator pre-selects the next dimensions, "reading" them in so that when the machining operation is finished he need merely depress the traverse button to go on to the next hole.

When the machine is to be operated from tape control, the tape is loaded into the tape reading mechanism, mounted on the back side of the

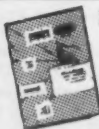
## Here's everything for PRECISION LAYOUT INSPECTION and ASSEMBLY



One source... your local Industrial Distributor... offers you as many as 300 different sizes and styles of CHALLENGE Precision Surface Equipment. Whatever your needs for layout, inspection, tooling or assembly, most of them are available for immediate delivery from dealer or factory stock. Or, if you need special sizes or types of large surface or floor plates, for example, Challenge's Custom Engineering Service is always available.

### ASK FOR LATEST CHALLENGE CATALOG SHOWING THE MOST COMPLETE LINE OF

Angle Plates	Surface Plates	Straight Edges
V-Blocks	Floor Plates	Welding Tables
Box Parallels	Lapping Plates	Layout Plates
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Handy new Catalog No. 838-W includes complete specifications and prices. See your Industrial Distributor or write Challenge for your free copy. Write Dept. MMS-12.

### THE CHALLENGE MACHINERY COMPANY

SE-111, Grand Haven, Michigan

For more data circle 605 on Postpaid Card

## A SMALL saw with LARGE capacity

MODEL A—Capacity 6" x 11" with BIG machine features. Rugged construction. Precision saw guides. Adjustable cutting pressure and rate of descent. Quick action swivel vise. 1/2" blade. Rotary blade brush. Automatic blade shut-off. 1/2 H.P. motor with overload protection. Table available to use saw vertically for contouring, notching, and slotting!



Send for FREE CATALOG.

Dept. M.

**W. F. Wells and Sons**  
Metal Cutting Band Saws

THREE RIVERS  
MICHIGAN

**Model A**

(North on old U.S. 131)

For more data circle 606 on Postpaid Card



## SPELLMACO 'SPOTTERS'

A matched set of transfer punches  
for toolmakers, machinists and tool cribs  
Used for transferring location of threaded, drilled  
and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for  
long life—.0025 undersize to facilitate use—Black oxide finish.

SET #3-17; 28 punches with indexed stand—sizes 1/32" to 1/2", by  
1/4"—plus handy 1 1/2" size. Length 4 7/8". ONLY \$17.90.

Single sizes available

**R. L. SPELLMAN CO. • URBANA, OHIO**

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CONTINENTAL Certified DRILLS

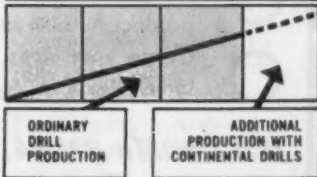


# TOUGH

## MORE HOLES PER DRILL

Today's drilling problems on both  
standard and new metals require  
twist drills with *something extra* built  
into them. That's why Continental  
drills are so acceptable to leading  
cost conscious production plants.  
Ask your industrial jobber

MAJOR PRODUCTION PLANTS PROVE  
CONTINENTAL DRILLS LAST LONGER!



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# CONTINENTAL DRILL CORPORATION

555 W. Adams St., Chicago 6, Illinois

For more data circle 608 on Postpaid Card

"LET"  
COUNT MORE HOLES  
SHOW YOU HOW  
TO CUT COSTS



## **new shop equipment . . .**

column, and the switch on the tape reader panel is turned to the "run" position. Depressing the "read-in" button delivers the first block of tape information to the machine. When the "ready light" on the panel is on, the operator need only press the automatic traverse button and the ma-

chine will proceed to the first location. As it comes into accurate location, the electronic verniers show machine error. These indicators are graduated to 0.0001 inch. While the machining is being accomplished at this point, the "read-in" button is again pressed to read the next block of tape information. As soon as the spindle is retracted, the operator may depress the automatic traverse button and the

machine will locate itself in the next desired position. Other lights are provided on the panel to indicate end of tape, error in tape, tape ready and so on. These indicator lights are also located in the tape reading mechanism. In this panel a Parity light is provided to indicate a fault in the tape itself. The tape and the preparation of the tape required is simple and inexpensive. The average manufacturing shop generally has all the facilities to make full use of this equipment without changing its method of operation.

As it is necessary to adjust the measuring system of the machine to the location of the workpiece, an infinitely variable zero off-set measuring adjustment

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The ratio between product identification and rising sales has been proved: a marked product outsells an unmarked product. Decrease your sales costs by increasing customer demand. Mark your products!

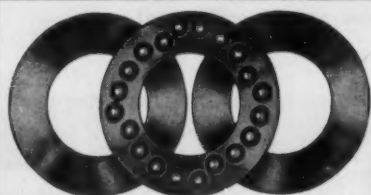
***IF IT'S WORTH MAKING, IT'S WORTH MARKING.***

**WRITE  
FOR  
CATALOGUE**

**GEO. T. SCHMIDT, INC.**  
1806 West Belle Plaine Avenue  
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## All kinds of BALL & ROLLER THRUST BEARINGS

Flat . . . self aligning . . . double action . . . grooved . . . double direction. Can make bearings up to 25" diameter. Also equipped to repair and regrind bearings.

Immediate delivery on most bearings.

**ACORN BEARING COMPANY**

(Established 1917)

68 Stanley Street

New Britain, Conn.

For more data circle 610 on Postpaid Card

*Peaslee*

ACTUAL SIZE



## PRECISION MINIATURE PINS

Our quantity production of standard-size, precision, stainless-steel pins is now expanded to miniature pins. Tolerances are held to .0002 on dia. Sizes run as small as .020 dia. x  $\frac{1}{16}$ ". Both straight and taper styles are produced, with taper pins ranging down to 9/0. We specialize on stainless-steel, instrument-type pins. Send your blueprints for prompt quotation.

**THE PEASLEE METAL PRODUCTS CO.**

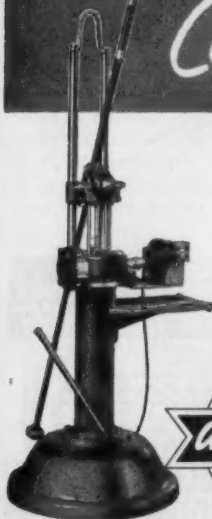
470 Tolland Street • East Hartford 8, Conn

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## POWER SCRAPER

*Cuts Production Costs...*

... 5 HOUR JOB CUT TO 50 MINUTES



One manufacturer was scraping flat pieces measuring 18 by 24 inches . . . each piece requiring 5 hours to scrape by hand. An Anderson Power Scraper cut scraping time to 50 minutes! That meant a substantial saving in production costs and another happy Anderson customer. Let us help you estimate how much this portable, easy-to-use power scraper will save for you.



Today, Write for Bulletin 12-22

**ANDERSON BROS. MFG. CO., Rockford, Ill.**

For more data circle 612 on Postpaid Card

December, 1957

modern machine shop 321

**HIGHER SPEEDS!  
FASTER GRINDING!**

**kipp**

## AIR GRINDERS

MODEL JA  
50,000 R.P.M.

**\$42<sup>00</sup>**

IN U.S.A.



Weight 12 ounces,  
length 6 $\frac{1}{4}$  inches;  
chuck size  $\frac{1}{8}$  inch.  
Wheel guard removed  
for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

**kipp**

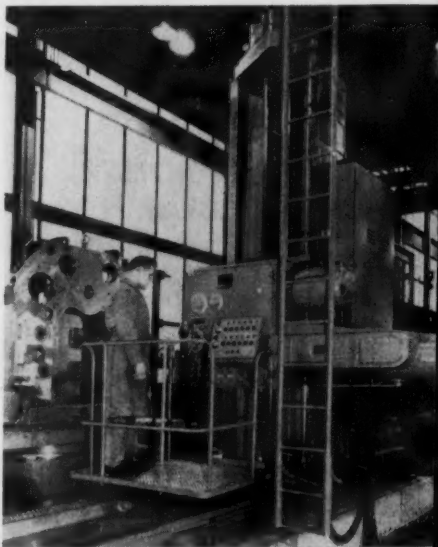
**MADISON-KIPP CORP.**

208 Waubesa St., Madison 10, Wis., U.S.A.

For more data circle 613 on Postpaid Card

322 modern machine shop

new shop equipment . . .



**Kaukauna Model 3040 Floor Type Horizontal Boring, Drilling and Milling Machine**

has been incorporated into this machining equipment.

Since the measuring system is completely divorced from the drive units, wear developing in the drive unit is not reflected in positioning accuracy. For more data circle 143 on Postpaid Card

**CUT TOOL COSTS** broken tools made like new again with **NU-TANGS**

Twisted or broken tangs replaced at low costs on any tool with a Morse Taper (sizes 1 to 6). Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

**NO WELDING! NO SLEEVES! NO SHORTENING! NO DISTORTION!**

Send them to us like this! **GUARANTEED STRONG AS NEW!** We return them like this!

**NU-TANGS INC.** 1339 Bates Avenue Cincinnati 25, Ohio

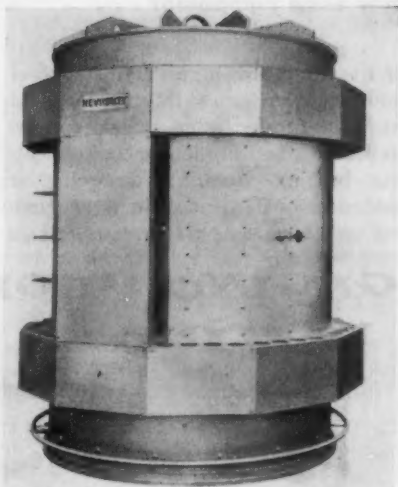
For more data circle 614 on Postpaid Card

December, 1957

## VACUUM FURNACE AVAILABLE IN WIDE RANGE

Hevi-Duty Electric Co., Milwaukee 1, Wis., recently announced a wide range of standard vacuum furnaces available for either single or double pump vacuums. Double pump, pit or bell type furnaces are built to operate at temperatures to 2,100 degrees F. Single pump vacuum retorts utilized in bell, pit, box or tube type furnaces are not recommended for applications where temperatures above 1,600 degrees F. are required.

Careful design of electric heating elements and zoned heat control assure clean, safe, easily regulated uniform heat throughout the furnace chamber. Layers of preformed and laminated insulation minimize heat losses. Water cooled flanges perfect a vacuum seal between retort and furnace shell. Hevi-Duty Vacuum Fur-

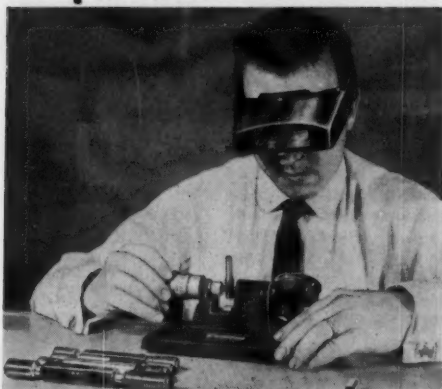


Hevi-Duty Standard Vacuum Furnace

naces have been widely used for the refinement, heat treatment and joining

★ ★ ★ ★ ★

## People work better when they SEE BETTER®



**HUGHES AIRCRAFT CO. Research and Development Lab.** uses MAGNI-FOCUSER for closer visual inspection of high precision gauges.

## MAGNI-FOCUSER

**EDROY PRODUCTS CO., Dept. P, 480 Lexington Ave., New York 17, N. Y.**

For more data circle 615 on Postpaid Card

For increased production, greater accuracy, fewer accidents and errors, use the MAGNI-FOCUSER—the new 3-D binocular magnifier with matched prismatic lenses. It provides needle-sharp vision — greatly magnified and in third dimension.

Scores of industrial jobs are being aided by the MAGNI-FOCUSER. It reduces eye strain and avoids squinting; leaves both hands free to work. It's light weight; can be worn with or without eye glasses; normal vision resumed simply by raising the head.

Speed your production by ordering now on 10-day trial basis without obligation. Only \$10.50. Immediate delivery. Or write for illustrated folder.

the 3-D Magnifier that speeds production and leaves both hands free to work

## new shop equipment . . .

of titanium, zirconium, stainless steel and other materials. Mechanical and physical properties of metals can be improved when hardening and annealing, brazing, sintering, degassing or soldering is performed in a vacuum.

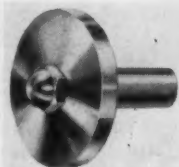
For more data circle 144 on Postpaid Card

## BAND SAW GUIDE WILL NOT RUST

A bandsaw guide that will not rust or cause sparks has been developed by Carter Products Co., Inc., 426 Wm. Alden Smith Building, 30 Ionia Ave., Southwest, Grand Rapids 2, Mich. Known as the Carter Bronzite, this guide is made entirely of non-ferrous metals for use on saws cutting explosives and inflammables. A feature of the Bronzite Guide is a wheel shaped thrust block made of the hardest bronze alloy known, which does not rotate with the movement of the blade, but can be turned to present new contact areas as blade grooves are worn. This is said to increase length of service. The entire guide, including thrust block, is non-ferrous and can be readily steam cleaned without danger of rust. Guides to fit all standard band saws are now in production.

For more data circle 145 on Postpaid Card

For more data circle 145 on Postpaid Card



Carter Band Saw Guide will not rust

## GAGING PROBLEM IN MIND?



Investigate Comtorplug  
Unique Expanding  
Plug Gage  
for Holes  
In Volume



**COMTORPLUG.** Interchangeable expanding plugs gage  
simple or special bores from  $\frac{1}{8}$ " to 10" diameter.

### UNIQUE ADVANTAGES

- Large dial with .0001" graduations.
- Indicates actual size, a fixed — not passing — reading.
- Portable — no wire, hoses, stands or electronic gear.
- Positive 2-point gaging — automatic centering.
- Assured accuracy regardless of who operates it.
- Shallow holes, deep holes, inside splines, open-end holes gaged easily.
- Detects ovality, back or front taper, bell mouth, barrel shape.
- Reaches to bottom of blind holes.
- Will gage work in the machine.
- A shop tool for all-day every day use.

Anybody can use Comtorplug with positive accuracy . . . at machine, bench, lab . . . anywhere, since it's unencumbered by wires, hose, heavy base or electronic gear. The same amplifier fits all plugs and fixed readings show ACTUAL SIZE, front or back taper, ovality, etc. Whatever problem bore you have in mind, COMTORPLUG may be the answer.

**COMTOR  
COMPANY**  
64 Farwell St.  
WALTHAM 54  
MASS.



**GET THE FACTS — REQUEST BULLETIN 50**

For more data circle 616 on Postpaid Card

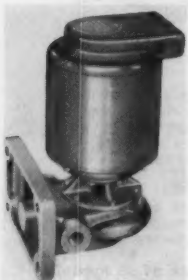
## OUTSIDE FLANGE MOUNTED COOLANT PUMP WITH TRIPLE DISCHARGE

The Ruthman Machinery Co., 1817 Reading Rd., Cincinnati 2, Ohio, has introduced its Rumaco Model 5S-4520 Outside Flange Mounted Pump.

This model has three discharges, one on the right side, one on the left side of the housing, and one, which is optionally tapped, through the inlet port of the mounting flange. The discharges may be used individually, in pairs or simultaneously.

The Model 5S-4520 is available with either 1/10 horsepower, 3,450 r.p.m. motor and in 1/4 horsepower, at 3,450 r.p.m. and is equipped with self-adjusting pretested seal.

This Model 5S-4520 Coolant Pump is dimensionally compact in that the maximum overall height of the 1/4 horsepower size is



Rumaco 5S-4520  
Coolant Pump  
with triple discharge

13-3/16 inches and the 1/10 horsepower size is 11-7/16 inches.

Various diameter impellers are available for capacities up to 30 gallons per minute and heads ranging up to 27 feet.

The manufacturer claims that this pump is especially suitable where limited space is a primary factor and where a comparatively shallow reservoir is involved.

For more data circle 146 on Postpaid Card

## TIME-SAVING BROACHES OFF-THE-SHELF

### Minute-Man KEYWAY BROACH KIT



With one of these kits you can cut a keyway in one minute for as little as one cent. For keyways from 1/16" to 1" in any bore from 1/4" to 3". Production Type

Keyway Broaches also in stock.

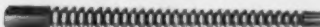
#### SQUARE BROACHES

1/8" to 3/4" holes



#### HEXAGON BROACHES

1/8" to 3/4" holes



#### ROUND BROACHES

1/4" to 1" holes



The duMONT CORP., Greenfield, Mass.

MAIL FREE BROACH CATALOG AND  
PRICE LIST S describing Square Broaches,  
Hexagon Broaches, Production Type Key-  
way Broaches and Keyway Broach Kits to

Name.....

Company.....

Address.....



For more data circle 617 on Postpaid Card

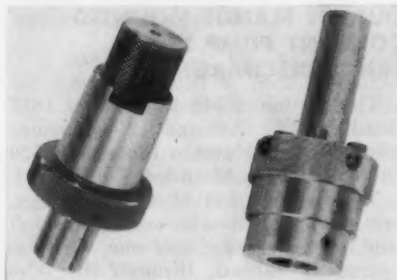
**new shop equipment . . .**

### **INTERNAL COLLET CHUCK**

Precision Processing Co., 3269 Casitas, Los Angeles, Calif., has announced the addition of the PreCor Internal Collet Chuck and the PreCor Align-A-Chuck to its line of products.

The PreCor Internal Collet Chuck features interchangeable collets ranging from 0.500 inch to 1.250 inches. The collet bodies are of soft steel and may be machined to production requirements. PreCor Internal Collet Chucks are available for all lathes.

The PreCor Align-A-Chuck provides corrections for misaligned turntables as well as angular, vertical, horizontal and radial inaccuracies found



(Left) PreCor Internal Collet Chuck for all lathes and (right) PreCor Align-A-Chuck

in tailstocks, arbors and spindles. The PreCor Align-A-Chuck locks into its compensating position with vernier adjusting set screws or may be used for various floating tool applications.

For more data circle 147 on Postpaid Card

## *You Can Rely on a* **ROUSSELLE**



### **THESE 40-TON PRESSES**

take job after job in stride and give you top speed and uniform output on a variety of work. They stress simplicity in every detail to achieve quicker set-ups, easier changeovers and simpler operation. All are extra rugged, high precision units, made to withstand hard usage and assure long, satisfactory service. They are very moderately priced.

*Manufacturers of Rousselle Presses*

**SERVICE MACHINE CO.** 2310 West 78th Street • Chicago 20, Ill.

Significant savings may result if you let our engineering staff assist you. There is no obligation.

Rousselle Presses are sold exclusively through leading machinery dealers.

Choice of 25 models in 5 to 40-ton sizes.

For more data circle 618 on Postpaid Card



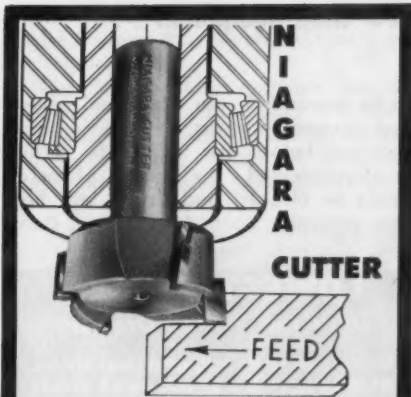
## MAINTENANCE KIT FOR PROPER GAGE BLOCK CARE

The DoAll Co., Des Plaines, Ill., now supplies the necessary tools for gage block maintenance with each gage block set of 38 pieces or larger. This complete kit, shown in the accompanying illustration, consists of a black granite-diorite deburring stone, a camel's hair brush, insulated forceps, a large box of lint free wipes, two informative booklets and two aerosol type liquid containers with specially compounded liquids for gage block care. One of them is DoAll Gage Block Preservative and the other is DoAll Gage Block Cleaner. The gage block sets, which are packaged with the maintenance kit, are sealed in an air exhausted plastic bag. The bag also contains a package of Silica Jel for moisture protection.

As the individual blocks are removed from the case, they are sprayed with the gage block cleaner from the aerosol container and dried with the lint free wipes. Any stray dust or lint can be brushed off with the camel's hair brush. The individual blocks are then wrung together or placed in the micro-step holders that enable them



Maintenance kit which accompanies all DoAll Gage Block Sets of 38 pieces or larger



## INTEGRAL SHANK Carbide Face Mills

Exclusive design with stubby 3/4" integral shank supports cutting load close to spindle bearings, eliminates overhang and increases rigidity. Adapters and special holders not required.

## INCREASE OUTPUT of Bridgeport Type MILLING MACHINES

Stubby design makes it possible for machine to deliver full capacity with increased depth and width of cut and faster feeds and speeds on aluminum, brass and steel parts.

## NEW LARGER SIZE Answers Popular Demand

Users improved production records with the 1 1/2", 2" and 2 1/2" sizes with 3/4" shank has created a demand for a 3" diameter cutter with 1 1/4" integral shank for larger milling machines.



All sizes available from stock singly and in sets of 3 or 6. Mail or phone orders L.Udlow 8400.

## NIAGARA CUTTER

Division of BOLLIER-DAMERELL, Inc.  
332 Niagara St., N. Tonawanda, N. Y.

## new shop equipment . . .

to be assembled into functional gages and allowed to return to a stable temperature before use. When the setup is disassembled, the blocks should again be cleaned and dried; but, before returning them to the case, they

should be sprayed with the gage block preservative. The use of micro-step holders makes feasible the adherence to uniform standards for nearly all measurement requirements.

The black granite-diorite deburring stone is included in the kit to permit the removal of burrs without injury to the gage blocks. A burr or embedded grit may be detected by the failure of blocks to wring together readily. Forcing the blocks together under this circumstance would injure the surface finish, and the blocks should be deburred. This is accomplished by rubbing the block firmly over the surface of the deburring stone until it begins to wring to the surface.

For more data circle 148 on Postpaid Card

★ ★ ★

## TWO SPINDLE BORING AND DRILLING MACHINE

With two fixed spindles mounted over a common table and carriage, the Cleereman Boring and Drilling Machine, product of Cleereman Machine Tool Corp., 555 West Washington Blvd., Chicago 6, Ill., enables one operator to bore two similar pieces at the same time with either the same or different size holes. The table moves in equal relationship to each spindle and the possibility of hole spacing errors is said to be completely eliminated.

## LOWEST PRICES

### Diamond Wheel Dressers

Guaranteed to be full, individual stones, mounted in 7/16 x 6" cold rolled shanks

Carat	Price
1/4	\$ 2.25
1/2	4.00
3/4	6.00
1	8.25
1 1/2	12.00
2	16.00



★ These diamonds can be set in any shank to your specification for \$1.00 each extra.

★ Prompt resetting service

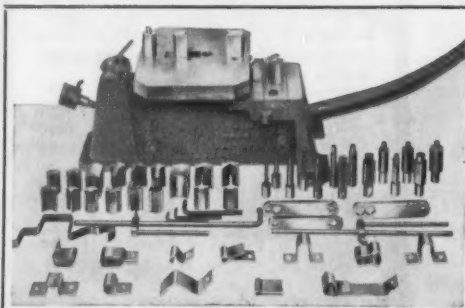
### Allstate Diamond Products, Inc.

Manufacturers of a complete line of diamond tools and wheels

245 W. 25th St., Dept. F, New York 1, N. Y.  
CHickering 4-7725

★ Dealers' inquiries invited

For more data circle 620 on Postpaid Card



## Multiform

### BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, and Steel Rule Dies for Metal Blanking.

### AIR OR HAND MODELS FOR UP TO

1/4" to 4" MATERIAL

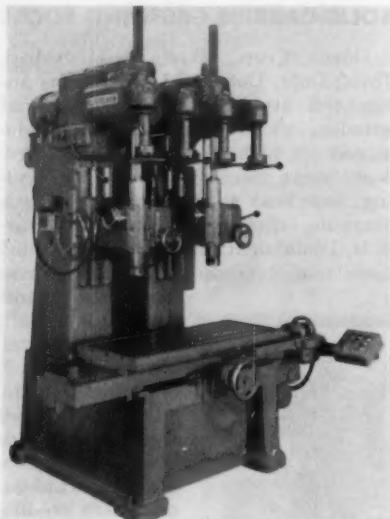
Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.

Dept. 6-M

Kalamazoo, Mich.

For more data circle 621 on Postpaid Card



**Cleereman Boring and Drilling Machine**

Time saving advantages are immediately apparent on all jobs which require two identical mating pieces or companion pieces, such as die sets and side frames.

When applied to the problem of boring a series of holes in line without jigs, this machine gives good results when provided with a job rod and automatic positioning to program longitudinal table movement, and with hand traverse to position the table transversely. Automatic positioning in

both directions or standard power rapid traverse may be secured, as may be required.

The two spindle machine has a standard Cleereman upper section mounted on a special base and, by using the spindles alternately, accurate boring at wide hole spacing is easily

**GET  
P·O·W·E·R  
FILING**

with the

**RINDIS FILING MACHINE**

Removes material 4 to 6 times  
faster than hand filing



The new RINDIS Bench Model Filing and Trimming Machine can be used for continuous, powerful cutting on all materials which have to be filed, trimmed or deburred. It offers these important advantages:

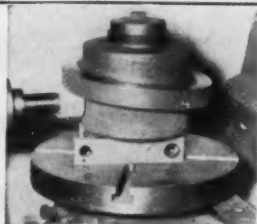
- 1 Substantial savings in man hours
- 2 Eliminates need for costly set-ups on milling or grinding machines
- 3 Easy operation. No special skill is required
- 4 Cuts without heat, abrasives, or coolant
- 5 Surfaces are filed perfectly flat
- 6 Speed and disc changes can be made quickly

For full details, write, wire or 'phone:

**NEWAGE  
INDUSTRIES,  
INC.**

222 York Road  
Turner 4-8494  
Jenkintown, Pa.

For more data circle 622 on Postpaid Card



**No problem too tricky**

Cam illustrated here resulted from turning the one it replaced "inside-out" to accomplish finer adjustment of mechanism... a typical Rowbottom job. We can help you, too. Send your specifications.

**THE ROWBOTTOM MACHINE CO., Waterbury, Conn.**

*Also builders of Cam Millers and Cam Grinders*

For more data circle 623 on Postpaid Card

**new shop equipment . . .**

achieved on a comparatively small machine.

The spindles are mounted with 26 inches between centers and the table is 20 by 51 inches with a travel of 15 by 24 inches. This allows a hole spacing up to 50 inches.

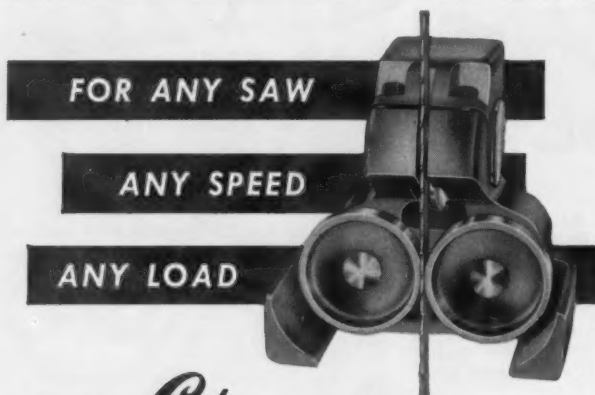
For more data circle 149 on Postpaid Card

**SOLID CARBIDE GRINDING TOOLS**

Dexco Corp., Raymac Division, 15490 Dale, Detroit 23, Mich., has announced its solid carbide internal grinding tools, which have been designed for high speed operation to remove more stock faster without loading, less heat and no dressing. Quite versatile, these Raymac Solid Carbide Tools, operating at recommended speeds of 2,000 to 3,000 s.f.p.m., are

adaptable to most jig and standard internal grinders. The manufacturer claims that the development of these rugged tools has given industry significant increases in production up to five times over old methods for finishing internal surfaces of tools, dies, gages, bushings and other hardened metals.

For more data circle 150 on Postpaid Card



**NEW *Carter*\* GUIDE  
UPS EFFICIENCY 167%**

Radical new principle of new Carter Guidall means new high efficiency on saws cutting any material at any speed or load. Blade rides on *outside perimeter* instead of on side of thrust wheel, permitting use of smaller bearing for higher speeds and heavier thrust loads. Thrust wheel and support rollers run on *inner raceway* of bearing, handle blade speeds up to 15,000 fpm and achieve 167% more efficiency than guides using outer raceway. Handles loads to 160 lbs. at top speeds, to 500 lbs. at lower speeds. Takes blades from 3/16" to 2 1/2". Fits any saw. Available with support rollers or support blocks—or *both* as a conversion unit. Guaranteed to provide full satisfaction. Write for details.

***Carter***

\*Makers of famous Carter Micro-Guides for all standard bandsaws.

**PRODUCTS CO., INC.**

426 Wm. Alden Smith Bldg., 30 Ionia, S.W., Grand Rapids, Mich.

For more data circle 624 on Postpaid Card



**View of Raymac  
Grinding Tools**

## SOLID CARBIDE BLADES FOR COUNTERBORES AND SPOTFACERS

More cuts per grind, and higher cutting speeds on very abrasive non-ferrous metals, such as aluminum, bronze castings, cast iron, sand castings and other difficult workpieces are now possible when using the solid carbide blades in the Adjustable Spotfacers and Counterbores available from the Robert H. Clark Co., 9330 Santa Monica Blvd., Beverly Hills, Calif. The blades are molded to exact shapes, sintered and supplied in carbide grades for specific applications. They can be procured with cutting edges unground or with grinding modified for use on specific metals. When ordering, material to be cut should be specified to insure correct grind. Clark Counterbores are available with either M-3 High Speed Steel Blades or with solid carbide blades.

For more data circle  
151 on Postpaid Card

★ ★ ★

## DRILLING UNIT

Model Machine  
Co., Inc., 4729  
Hawthorne St.,  
Philadelphia 24,

Pa., is now marketing a high quality, pneumatic drilling unit. It is now practical to develop low cost special units to drill, countersink, deburr and so on for small, as well as large, quantity production due to the low cost of the Model Drilling Unit. A free sliding, well supported, double acting cylinder is used for reciprocating motion. Precision high speed bearings are used throughout the unit. A micrometer stop is incorporated to give a positive

# COMPARE

and you'll get a **BIG NEW**

## Johnson

model **J**

HEAVY DUTY METAL  
CUTTING BAND SAW



Capacity—10" rounds, 18" flats • Motor— $\frac{1}{2}$  hp  
(Any voltage available) • Wheel Diameter—  
15" • Floor Space—65" x 31" • Bed—11 wide,  
44 long, 6 deep, 34 high • Overall Height  
(closed)—39" • Weight—Approx. 750 lbs  
• Speeds—36, 55, 120, 180 feet per minute

★

**COMPARE** the handsome, husky Johnson Model J with any metal cutting saw and here's what you'll find:

- Johnson leads the way in dependable, well-engineered, high performance band saws.
- A Johnson saw will cut anything in your stock pile, and do it faster.
- Johnson saws contain more exclusive construction and performance features that save time and money.
- Johnson saws are the finest metal cutting machines available anywhere—and, at the lowest price!

**COMPARE**... and see for yourself how easily you can save time, labor and production dollars with a Johnson saw. Complete information, prices—are yours for the asking.

## Johnson MANUFACTURING CORPORATION

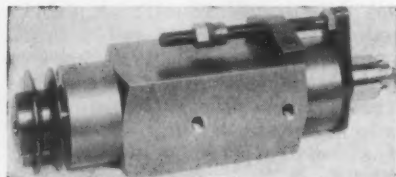
Main Plant: Barnes Street, Albion, Michigan  
Eastern Distributor  
R. J. R. KELLY CO.  
Hale Bldg., 51 Main St.  
East Orange, N. J.

Midwestern Distributor  
W. G. LUNDHARK  
75 N. Broadway  
Des Plaines, Ill.

Western Distributor  
MATTHEWS DISTRIBUTORS  
1605 Solano Avenue  
Berkeley, Calif.

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## new shop equipment . . .



Model Drilling Unit has a 1 1/2 inch stroke

depth control. The standard unit has a 1/4 inch drill capacity and a 1 1/2 inch stroke.

For more data circle 152 on Postpaid Card

★ ★ ★

## AUTOMATIC IN-LINE FOUR STAND TRANSFER MACHINE

Wickes Corp., Machine Tool Division, 515 North Washington, Saginaw,

Mich., has introduced an automatic in-line four stand transfer machine for turning forged steel crankshaft pins at 250 f.p.m. with carbide cutting tools. This machine consists of four in-line lathes.

Each station spindle in the line is powered by a 60 h.p., d.c. variable speed motor. In other words, each unit has a 3:1 speed range for cheeking or facing and plunge-forming diameters of the crankpins.

Each machine cycle in the line is automatic. During a typical run, crankshafts are first loaded on the first section of the automatic conveyor. As the shafts are placed on the line, they are automatically transferred up to the spindle of the first machine, until that section of the line is loaded.

When a crankshaft arrives opposite the first spindle of the No. 1 lathe, a cross slide traveling at right angles to the automated conveyor picks up the shaft, reverses and carries the work

*The* **VERDICT**  
*'SUPERTEST'*



**.0005" TEST  
INDICATOR**

Price  
\$16.00

**ALSO REPRESENTATIVE FOR:**

**MERCER**  
Mercer Dial Gauges, Comparators,  
Bore Gauges

**BENSON**  
Benson Vernier Instruments

**HELEK**  
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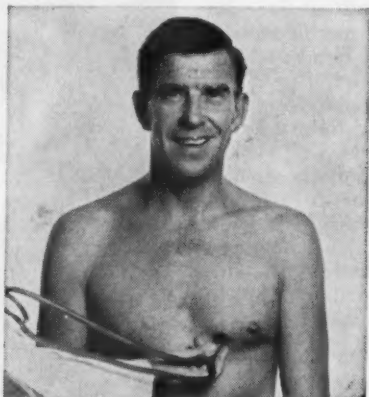
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Dealer Inquiries Invited

### TRANSOCEAN TRADING CO.

6453 Santa Monica Blvd. • Los Angeles 38, Calif.

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332 modern machine shop



**have a checkup yearly**

**IT'S YOUR BEST  
CANCER INSURANCE!**

**American Cancer Society**



December, 1957



about 5 feet, placing it in the open chucks of the machine. The lathe automatically clamps the work and brings the cutting tools into action.

Less than a minute later, the No. 1 pin of the shaft is completed and a second overhead slide goes into action. This unit picks up the shaft as the chucks open up, and carries the work back to the automatic in-line transfer device which then carries the shaft to the next station on the lathe.

The movements to the next three stations are identical, except that a different pin is machined. The chucking in each succeeding station is also different to compensate for the position of the pin involved.

Every station of the automated line can be operated either automatically, manually or independently to provide flexibility in tool changing or production. The work cycle of each station is set so that each time a crankshaft is completed, another takes its place at once. The total capacity of the automated transfer line is 32 crankshafts, eight between each station.

In case of a tool change on

one of the stations, the automated line is set so that the instant a crankshaft is released from a restarted station, it automatically transfers the crankshaft up to the closest slot nearest the next spindle. The automatic conveyor keeps repeating this process until the whole line between stations is loaded to capacity. This eliminates any gaps on the transfer line, or the necessity of a lathe idling for the lack of work.

## THE MOST USEFUL TOOL IN YOUR SHOP!

### ECONOMY ELEVATING TABLE

- DIE HANDLER • CONSTANT HEIGHT TABLE
- LOAD LEVELER • PORTABLE WORK TABLE



Dimensions.....24" x 36" Lift.....24" min. to 42" max.

Capacity .....2000 lbs. Price: F.O.B. Chicago \$245.00

Free 10 day trial in your plant with return privilege

#### Positive Performance

Self-locking Acme screws hold load safely, securely, at any height. Roller bearing wheels.

#### Compact Design

No projecting parts — all four sides accessible; crank studs at both ends; three table surfaces.

**ECONOMY**  
**ENGINEERING**

4507 W. Lake St.

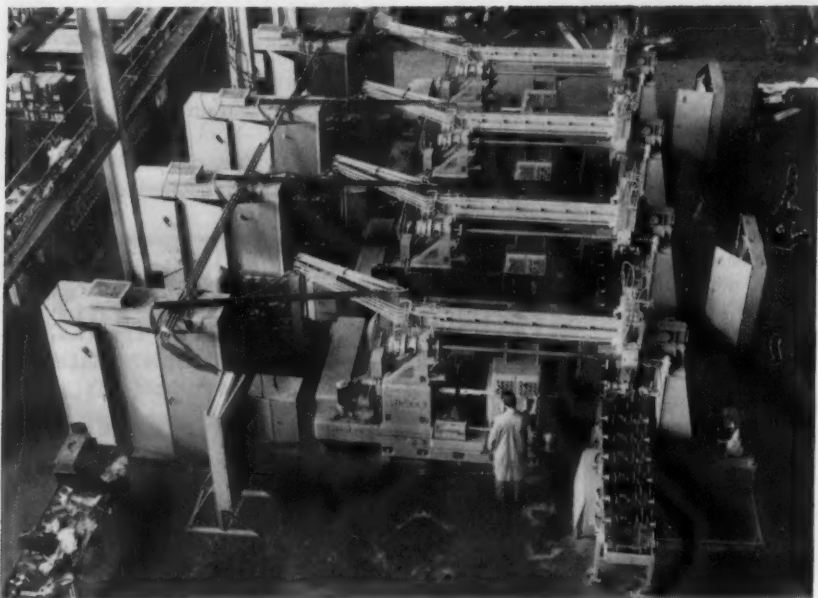
Chicago 24, Illinois

For more data circle 628 on Postpaid Card

modern machine shop

333

**new shop equipment . . .**



*Wickes Automatic In-Line Four Stand Transfer Machine for turning crankshaft pins*

Each machine in the line is a double end drive unit. Feeds are controlled by opposed cross slides for straight plunging or in-feed. The slides also are activated hydraulically by means of a cylinder through a cam bar. An

interesting feature here is that the cam bar actuates the slides through shoes, rather than a roller, to both absorb the thrust of the cutting tool and to provide more rigidity. Like the cross slides, the chucks are also controlled hydraulically.

The carbide cutting tools in each station approach the work both from the front and the rear. Two round cutting tools are used in the front for the cheeking operation, and a triangular shaped tool for plunge forming. The two triangular cutting tools in the back assist in plunge forming. The round cutting tools are held in a slightly tipped angle to provide a negative rake, while the triangular tools approach the work with a zero

**REPRESENTATION**

New group in New England area. Located adjacent Boston. Foreign or domestic products desired in the machine tool, mechanical and electronic component or product field. Only soldering fluxes handled at present. Showroom and warehouse space available.

**ALVIN E. SNELL**

40 Cross Street, Winchester, Massachusetts

For more data circle 629 on Postpaid Card

# looking for a competitive edge?



**Helicarb Cutters give maximum stock removal  
with finishes of 20 rms and better!**

"Helicarb" Cutters permit optimum use of the new advances in machine tool design. The constant cutting angle over the full flute distributes the chip load uniformly. This shear-like cutting action reduces impact and chatter and removes from 3 to 10 times more metal than straight-tooth carbide cutters. They really pay off where good finish is required since rough and finish cuts can be combined on many jobs.

"ONE-PASS" cutters for popular hydraulic ports!



For more data circle 630 on Postpaid Card



Your "Helicarb" dealer can give  
you complete information.

## new shop equipment . . .

or slightly positive rake. The feed for plunge forming is held to about 0.010 inch across the 2 inch width of the cut. Tools for cheeking, which involves an interrupted cut, are held to feeds of 0.040 to 0.060 inch. The depths of cuts average about  $\frac{1}{4}$  inch at speeds of 250 feet per minute.

For more data circle 153 on Postpaid Card

★ ★ ★

### TWO FLUTE END MILL

A line of two flute Hy-Spiral End Mills has been announced by The Cleveland Twist Drill Co., 1242 East 49th St., Cleveland 14, Ohio. These end mills have been designed to provide the proper shear cutting action that is necessary in order to obtain fine finishes and long tool life when milling non-ferrous materials.

**LAYOUT FLUID**  
FOR ANY METAL



**TRIAL OFFER**  
2 FOUR OZ.  
"BRUSH-IN-CAP"  
CANS: \$1.00

Send me my order of D-R LAYOUT FLUID right away!

Bill me ☐ Bill my company ☐

Name \_\_\_\_\_

Company Name \_\_\_\_\_

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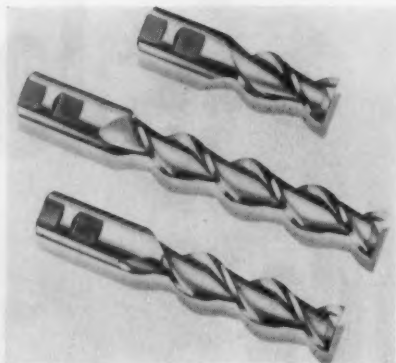
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

**DAYTON ROGERS**  
*Manufacturing Company*

MINNEAPOLIS 7D, MINNESOTA

For more data circle 631 on Postpaid Card

336 modern machine shop



Cleveland Two Flute Hy-Spiral End Mills

Available in regular, long and extra long types, these high speed end mills were developed primarily for aircraft forging tracer milling. They are general purpose end mills for non-ferrous milling, but have been used successfully in many ferrous applications. In addition to tracer milling applications, they may also be used for slabbing, cavity and deep pocket milling and slotting in non-ferrous materials.

Proper rake angles and cutting edge relief insure efficient milling in both soft, gummy, non-ferrous materials, as well as the harder alloys. The cutting edges of the Cleveland Hy-Spiral End Mills are so relieved that build-up is said to be eliminated when milling the soft materials. In addition, the cutting edge relief is ground so that maximum strength is retained directly behind these cutting edges. This aids in the dissipation of cutting edge heat and increases tool life.

The wide, highly polished flutes and high helix angle are claimed to insure positive chip ejection and to eliminate cutting face build-up, even in the deeper pocketing applications.

The regular and long types of Hy-Spiral End Mills are made in sizes from  $\frac{1}{4}$  inch to 2 inches in diameter. For more data circle 154 on Postpaid Card

December, 1957

# a PROCUNIER TAPPER pays for itself!

**Built-in features and operating advantages  
increase production—reduce costs!**

Any way you look at it—you save and gain with Procunier Tappers. It is an uncontested fact, when you use Procunier you are enjoying the advantages of the finest tapping heads. Countless reports indicate tremendous savings on taps, automatic production increases, drastic reduction in parts spoilage, less operator fatigue, fewer "down hours" and precision accuracy in threads and tapped holes. Taking these gains and savings into consideration you can quickly see why Procunier heads "pay for themselves in just a short time!"

Procunier heads offer high speed, quiet operation, a new, powerful drive—with finger tip pressure; economical lightness, "long life" ruggedness and an accuracy and dependability you can consistently count upon! And, there's a versatile model for practically every tapping operation.

## Send for FREE Brochure

Find out how you, too, can benefit with Procunier. Get the full construction details—see the many unusual tapping applications—get the "inside story" on why Procunier has led the field for more than 30 years. Write today—now.



**MAIL  
COUPON  
TODAY!**

**PROCUNIER**  
**Safety Chuck Co.**  
12 S. Clinton St.,  
Dept. 12  
Chicago 6, Illinois

### PROCUNIER SAFETY CHUCK CO.

12 S. Clinton St., Chicago 6, Ill. Dept. 12  
Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

City.....Zone.....State.....

Name.....

Address.....

For more data circle 632 on Postpaid Card

where  
to  
get it

## where to get it

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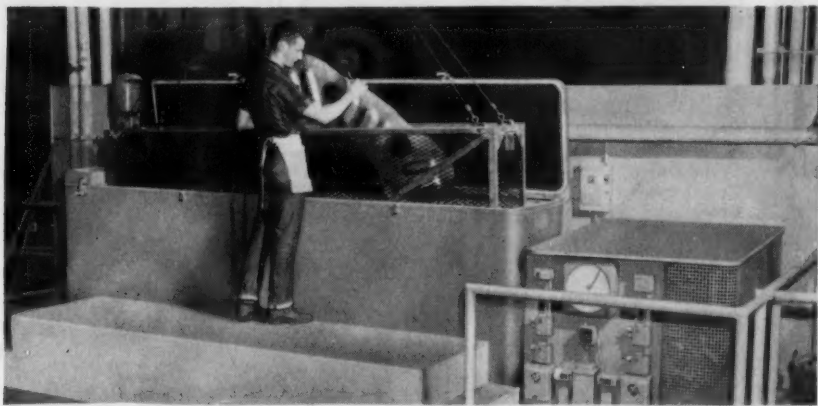
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**NORTH AMERICAN AVIATION**  
**Cures and Stabilizes AM-350 STAINLESS STEEL**  
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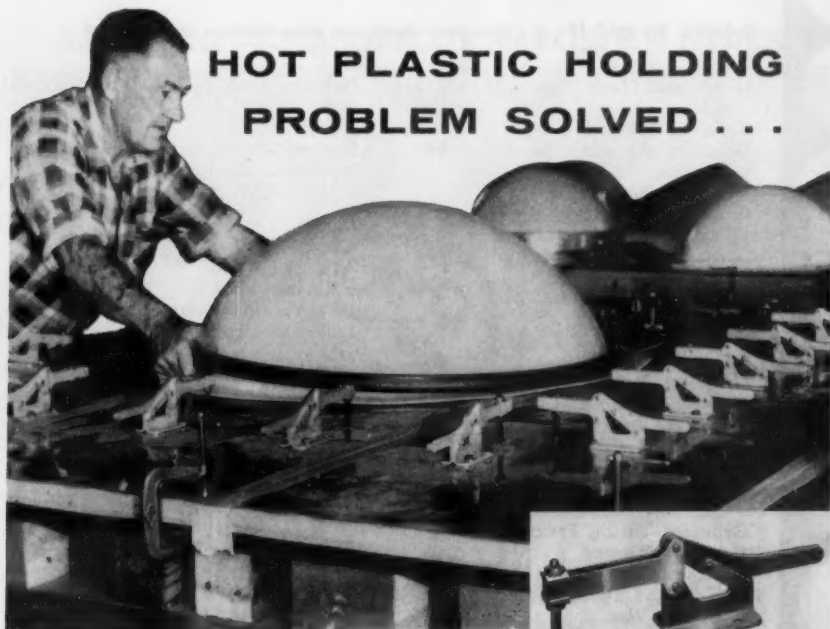
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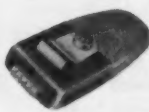
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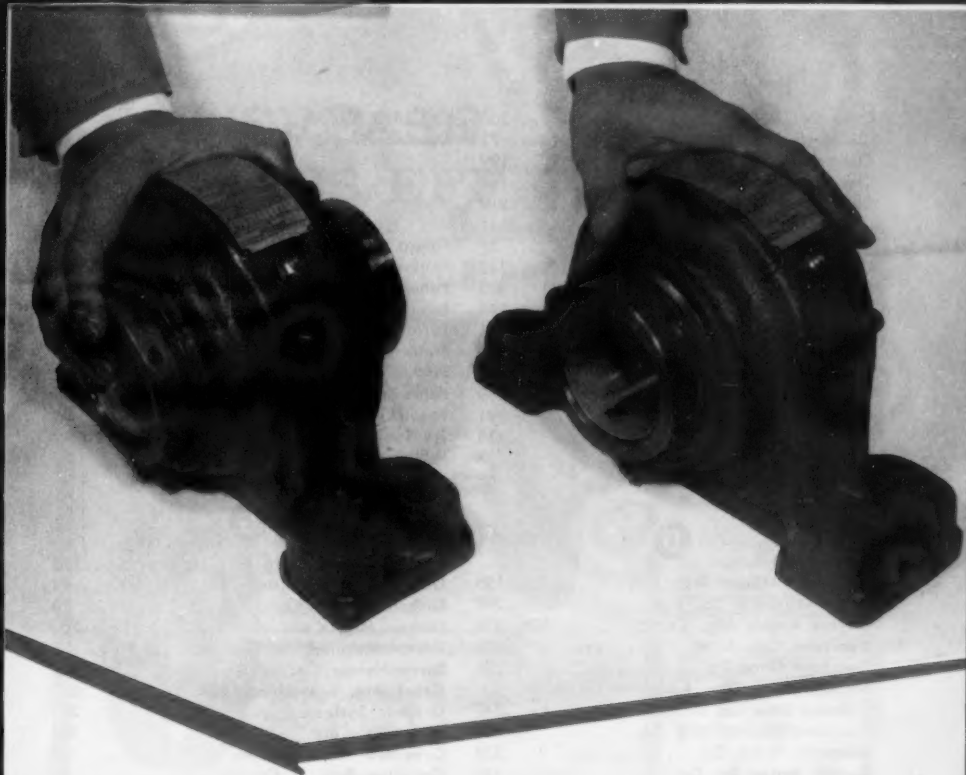
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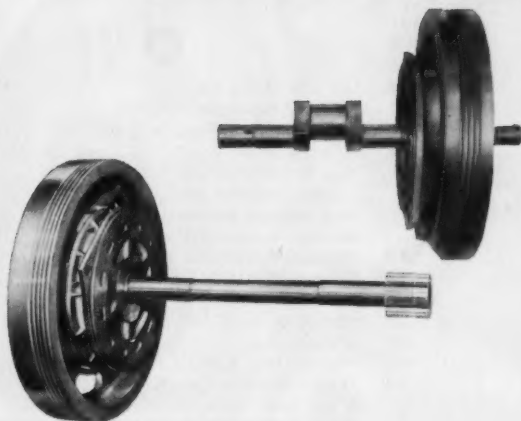
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Combination Clutch and Brake unit mounted on crankshaft within flywheel as supplied for flywheel type gap or straight side presses.

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**Investigate** the advantages of the Minster patented Combination Air Friction Clutch and Brake if you are considering modernizing your machines. Naturally, a new clutch unit will not make a new machine out of your old press. However, if your equipment is in good condition, or can be reconditioned reasonably, a Minster Clutch is the most profitable way for you to increase efficiency.

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**Bulletin CC 57** describes Minster Clutches for press conversion. Copy by request on company letterhead.

**THE MINSTER MACHINE COMPANY**  
MINSTER, OHIO

For more data circle 639 on Postpaid Card

December, 1957

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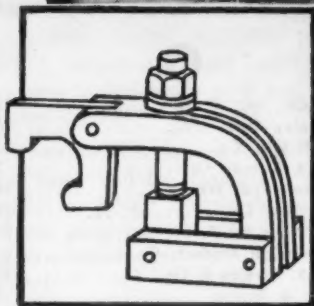
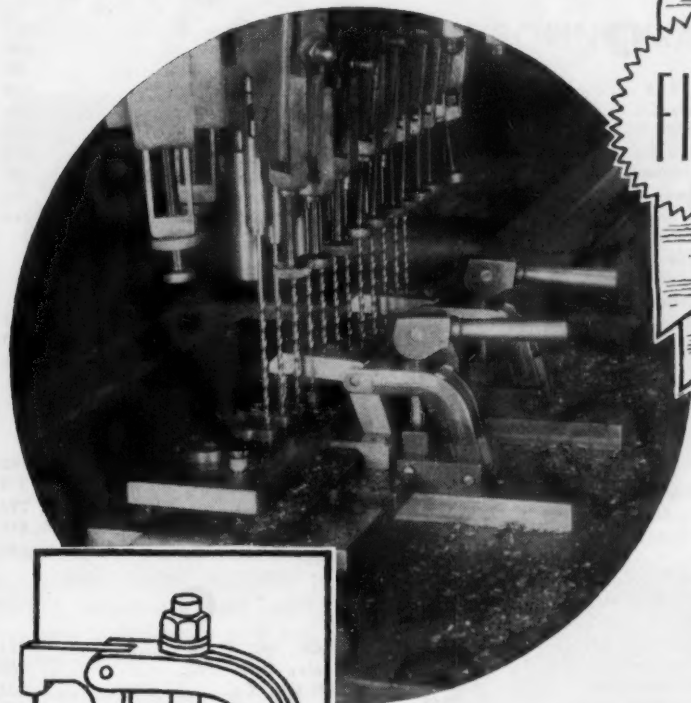
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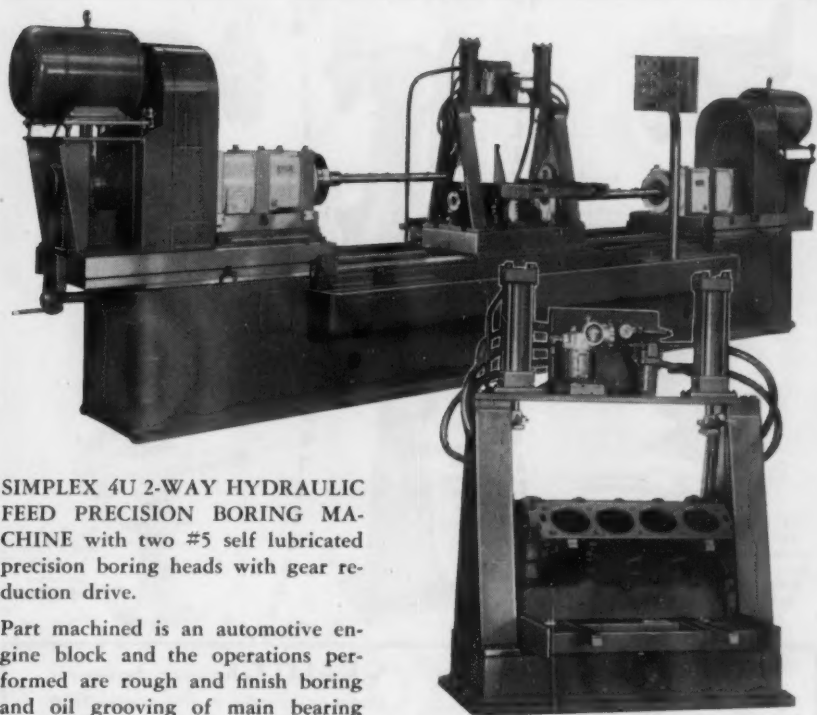
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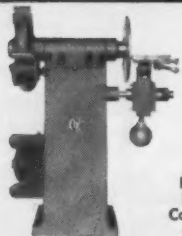
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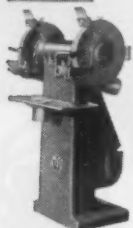
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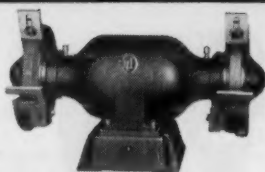
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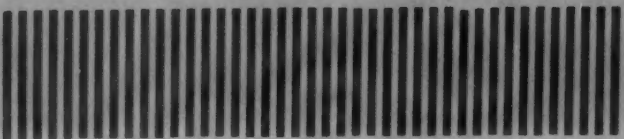
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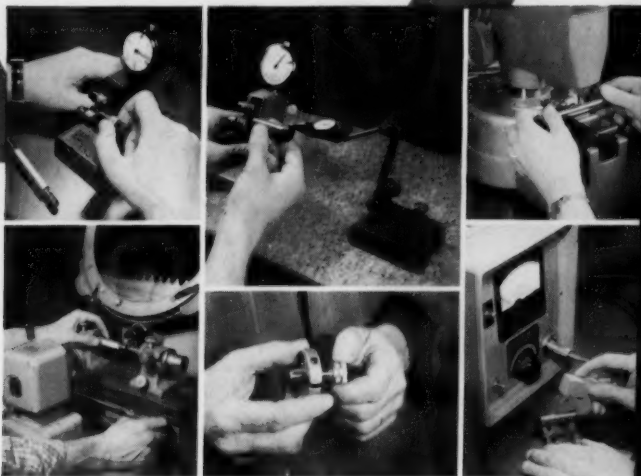
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